The provision of healthy food in a school tuck shop: Does it influence Bloemfontein primary school learners' perceptions, attitudes and behaviour towards healthy eating?

by
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DECLARATION

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Francette Bekker Date: 1 September 2012

ABSTRACT

THE PROVISION OF HEALTHY FOOD IN A SCHOOL TUCK SHOP: DOES IT INFLUENCE BLOEMFONTEIN PRIMARY SCHOOL LEARNERS' PERCEPTIONS, ATTITUDES AND BEHAVIOUR TOWARDS HEALTHY EATING?

Introduction and Objectives: Schools can serve as a supportive environment for the promotion of healthy eating in order to prevent childhood overweight and obesity and the development of noncommunicable diseases such as cardiovascular diseases, type 2 diabetes mellitus, fatty liver disease, muscoskeletal disorders and some cancers. Tuck shops at schools often offer unhealthy items that are energy dense and high in fat and/or sugar with a low content of vitamins, minerals and dietary fibre. The availability of unhealthy items in tuck shops prevents learners from making healthy food choices, since children tend to choose unhealthy foods when given a choice. In addition to unhealthy items offered by tuck shops, learners also bring unhealthy items to school in their lunchboxes. The aim of the study was to investigate the influence of a nutritionally-regulated tuck shop on primary school learners' perceptions, attitudes and behaviour towards healthy eating in a Bloemfontein, Afrikaans medium, co-education primary school, and compare it to learners of a school with a conventional tuck shop.

Methods: In a cross-sectional survey with an analytical component, grade 2 to 7 learners in a school with a nutritionally-regulated tuck shop (n=116) and a school with a conventional tuck shop (n=141) completed a questionnaire. Six learners per grade also took part in focus group discussions. Questions related to lunchbox contents and perceptions, attitudes and behaviour towards the tuck shop and healthy eating. Nutritional information of the items available for purchase at each of the school tuck shops was collected.

Results: The lunchboxes of learners in the school with a nutritionally-regulated tuck shop contained significantly ($p<0.05$) more healthy items (fruit, water and muffins), as well as significantly more unhealthy items (sweets and chips). The items offered by the nutritionally-regulated tuck shop contained approximately half the kilojoules compared to items offered by the conventional tuck shop. Learners in the school with a nutritionally-regulated tuck shop liked certain fruits and vegetables significantly ($p<0.05$) more than learners in the school with a conventional tuck shop. Statistical significant

differences ($p<0.05$) between different grades and gender showed that grade 2 learners in both schools had a less positive attitude towards certain fruit and vegetables compared to the older learners, while girls in both schools were more positive towards certain fruits and vegetables compared to boys. Younger learners had a more positive attitude towards their nutritionally-regulated tuck shop than older learners. In both schools learners had similar perceptions regarding the particular school's tuck shop and healthy eating.

Conclusion: The hypothesis that learners in a school with a nutritionally-regulated tuck shop have positive attitudes, perceptions and behaviour towards healthy eating was rejected. The availability of healthier items in a school tuck shop had a positive influence on certain behaviours and attitudes of learners, but the potential value of controlling the type of items available for purchase at schools might be counteracted by lunchbox contents, certain fixed eating patterns, perceptions of learners and previous exposure to a conventional tuck shop. Recommendations include a multi-pronged approach such as the Health Promoting Schools concept.

OPSOMMING

DIE VOORSIENING VAN GESONDE VOEDSEL IN 'N SKOOLSNOEPIE: BEÏNVLOED DIT LAERSKOOLLEERDERS IN BLOEMFONTEIN SE PERSEPSIES, HOUDING EN GEDRAG TEENOOR GESONDE EETGEWOONTES?

Inleiding en doelwitte: Skole bied 'n omgewing waar goeie eetgewoontes bevorder kan word ten einde oorgewig en vetsug in kinders te voorkom, asook die ontwikkeling van nie-oordraagbare siektes soos kardiovaskulêre siektes, tipe-2 diabetes mellitus, lewervervetting sindroom, ortopediese komplikasies en sekere soorte kanker. Snoepies in skole voorsien meestal ongesonde items met 'n hoë energie, vet- en/of suikerinhoud en wat laag is in vitamiene, minerale en dieetvesel. Die beskikbaarheid van ongesonde items in snoepies verhoed dat leerders gesonde voelselkeuses uitoefen, omdat kinders geneig is om voorkeur aan ongesonde kos te gee as hulle 'n keuse gebied word. Benewens die ongesonde items wat snoepies aanbied, neem leerders boonop ongesonde kos in hul kosblikke skooltoe. Die doel van die studie was om by 'n Afrikaans dubbelmedium laerskool in Bloemfontein die invloed van 'n voedingkundig-gereguleerde snoepie op leerders se persepsies, houdings en gedrag teenoor gesonde eetgewoontes te ondersoek en te vergelyk met leerders in 'n skool met 'n konvensionele snoepie.

Metodes: In 'n deursnit-opname met 'n analitiese komponent, het graad 2 tot 7 leerders in 'n skool met 'n voedingkundig-gereguleerde snoepie (n=116) en 'n skool met 'n konvensionele snoepie (n=141), 'n vraelys ingevul. Ses leerders in elke graad in elk van die skole het ook aan fokusgroepbesprekings deelgeneem. Vrae het oor die inhoud van kosblikke, asook persepsies, houding en gedrag teenoor die snoepie en gesonde eetgewoontes, gehandel. Voedingsinligting rakende die items wat in elk van die skole se snoepies verkoop word, is ook ingesamel.

Resultate: Die kosblikke van leerders in 'n skool met 'n voedingkundig-gereguleerde snoepie het statisties beduidend ($p<0.05$) meer gesonde items bevat (vrugte, water en muffins), maar ook beduidend meer ongesonde items (lekkergoed en aartappelskyfies). Voedsel-items wat in die voedingkundig-gereguleerde snoepie beskikbaar was, het omtrent die helfte minder energie bevat as voedsel-items wat in die konvensionele snoepie beskikbaar was. Leerders in 'n skool met 'n voedingkundig-gereguleerde snoepie het beduidend ($p<0.05$) meer van sekere groente en vrugte gehou as leerders in 'n skool

met ‘n konvensionele snoepie. Statisties beduidende ($p<0.05$) verskille tussen verskillende grade en die houding van verskillende geslagte dui daarop dat graad 2 leerders in albei skole minder positief gevoel het oor sekere groente en vrugte as ouer leerders, terwyl meisies in albei skole ‘n meer positiewe houding teenoor sekere groente en vrugte getoon het as seuns. Jonger leerders het ‘n meer positiewe houding teenoor hulle voedingkundig-gereguleerde snoepie getoon as ouer leerders. In albei skole het leerders soortgelyke persepsies rondom hul onderskeie skole se snoepies en gesonde eetgewoontes openbaar.

Gevolgtrekking: Die hipotese dat leerders in ‘n skool met ‘n voedingkundig-gereguleerde snoepie positiewe persepsies, houding en gedrag teenoor gesonde eetgewoontes toon is nie aanvaar nie. Die beskikbaarheid van gesonder items in ‘n skoolsnoepie het 'n positiewe invloed op sekere eetgewoontes en houdings van die leerders, maar die potensiële waarde daarvan om die tipes voedsel wat by skole te koop aangebied word te reguleer mag egter teengewerk word deur kosblikke se inhoud asook sekere vaste eetpatrone, persepsies van leerders en vorige blootstelling aan ‘n konvensionele snoepie. ‘n Veelvoudige benadering soos die konsep van ‘n Gesondheidbevorderingskool word aanbeveel.

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CONTRIBUTIONS BY PRINCIPAL RESEARCHER AND FELLOW RESEARCHERS

The principal researcher (Francette Bekker) developed the idea and the protocol. The principal researcher planned the research, undertook data collection (with the assistance of a research assistant), captured the data for analyses, analysed the data with the assistance of a statistician, interpreted the data and drafted the thesis. Mrs Maritha Marais and Mrs Nelene Koen (Supervisors) provided input at all stages and revised the protocol and thesis.

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LIST OF ACRONYMS AND ABBREVIATIONS

FBDG	Food Based Dietary Guidelines
NCDs	Noncommunicable diseases
NFCS	The National Food Consumption Survey
USA	United States of America
WHO	World Health Organisation
YRBS	Youth Risk Behaviour Survey

LIST OF DEFINITIONS

Attitude	a settled way of thinking or feeling.[1]
Behaviour	the way in which someone behaves or conducts themself.[1]
Conventional tuck shop	a tuck shop that is customary or traditional.[1] In South Africa tuck shops mainly sell unhealthy food and beverage items.[2]
Health Promoting School	a school that is constantly strengthening its capacity as a healthy setting for living, learning and working by engaging with health and education officials, teachers, teacher's unions, students, parents, health providers and community leaders in efforts to make a school a healthy place.[3]
Healthy foods	items with a high nutrient density (good source of micronutrients) that are high in fibre, low in saturated fat, contain no added sugar and are low in sodium e.g. fruit, vegetables, unsweetened fruit juice, yoghurt without added sugar, water, low fat milk, nuts and brown bread sandwiches.[2,4,5]
Nutritionally-regulated tuck shop	a tuck shop that controls the types of food items that are available to purchase.[1] Healthy foods are mostly sold.[2,4,5]
Perception	a way of understanding or interpreting something.[1]
Snack	a small amount of food eaten between meals; a light meal that is eaten in a hurry or in a casual manner.[1]
Tuck shop	a school store where learners can purchase food and beverages.[2]

	(*tuck*) food eaten by children at school as a snack.[1]
Vendor	a person or company offering something for sale, especially a trader in the street.[1]
Unhealthy foods	energy-dense items with a high saturated fat and/or sugar content, and low content of vitamins, minerals and dietary fibre e.g. potato chips (crisps), sweets, chocolates, soft drinks, meat pies, biscuits, cakes, hot dogs and white bread.[2]

CHAPTER 1: LITERATURE REVIEW AND MOTIVATION FOR THE STUDY

1.1 INTRODUCTION

Worldwide trends of increasing weight gain and obesity are reported in children and the tendency among children to consume unhealthy energy-dense foods has increased.[4,6-8] As children develop eating habits from an early age, a need is recognised for intervention strategies during childhood to prevent overweight and obesity.[4,6,7,9,10] Since children between the ages of 6 and 18 years spend considerable time at school each day, the importance of the school environment to facilitate interventions to combat overweight and obesity, should not be underestimated.[10-14] Tuck shops and vendors at schools mostly sell unhealthy food items such as sweets, chocolates, potato chips (crisps), meat pies, hot dogs, biscuits, cakes and soft drinks.[2,15] These unhealthy food items are high in energy and contain large amounts of fat and/or sugar and small amounts of vitamins, minerals and dietary fibre.[2] Wiles *et al.* (2011) describe the average unhealthy tuck shop snack as an item containing 806kJ with 10.2g fat and 1.4g dietary fibre, while the average unhealthy beverage contains 448kJ, 12.6g added sugar and 3.7g cholesterol.[16] Access to these unhealthy food items promote unhealthy food choices of children.[15] The development and implementation of school food policies and strategies for managing the types of food available in schools might help to encourage healthy eating habits and help to contribute to the prevention of overweight and obesity.[10]

1.2 CHILDHOOD OBESITY AND NONCOMMUNICABLE DISEASES

The World Health Organisation (WHO) estimated in 2010, that globally, 42 million children under the age of five are overweight.[8] A secondary analysis of the anthropometric data from the National Food Consumption Survey (NFCS) conducted in 1999, found that 30% of South African children one to nine years old were either overweight or obese.[17] While the 2008 report of the South African National Youth Risk Behaviour Survey (YRBS) indicates that 20% of South African adolescents are overweight and 5% are obese.[18] The long-term consequences of childhood overweight and obesity often only present itself during adulthood.[7,19] These consequences include noncommunicable diseases (NCDs) such as cardiovascular diseases (including heart disease, hypertension and stroke), type 2 diabetes mellitus, fatty liver disease, muscoskeletal disorders (e.g. osteoarthritis) and some cancers (e.g. endometrial, breast and colon).[7,19] The risk factors for NCDs development include

physical inactivity and an unhealthy diet which leads to metabolic and physiological changes such as raised blood pressure, overweight/obesity, hyperglycaemia, insulin resistance and hyperlipidemia.[20] As a result of NCDs, 2.6 million people die each year.[19]

1.3 INTERVENTIONS DURING CHILDHOOD TO REDUCE THE INCIDENCE OF NONCOMMUNICABLE DISEASES

Unhealthy eating habits is regarded as a modifiable risk factor for the development of NCDs.[4] Unhealthy dietary behaviours acquired at a young age usually persist as children grow into adulthood, thus predisposing children to obesity in later life.[4,6,7] The WHO recommends that in order to reduce the incidence of NCDs early intervention is needed to target children while their food habits are still developing.[6,7,10]

According to Choi *et al*. (2008), learners' dietary habits are especially influenced by the school environment and peer groups.[21] Labadarios *et al.* (2005) are of the opinion that obesity rates in children can be reduced by implementing nutrition interventions at clinics, crèches and at schools.[22] It is therefore necessary to investigate the role the school environment plays in the implementation of nutrition interventions.

1.4 FACTORS INFLUENCING CHILDREN'S DIETARY BEHAVIOUR AND NUTRITION-RELATED PERCEPTIONS

Understanding the factors that influence children's dietary behaviour and nutrition-related perceptions, may be of value when planning nutrition interventions. The most important factors identified are depicted in Figure 1.1.

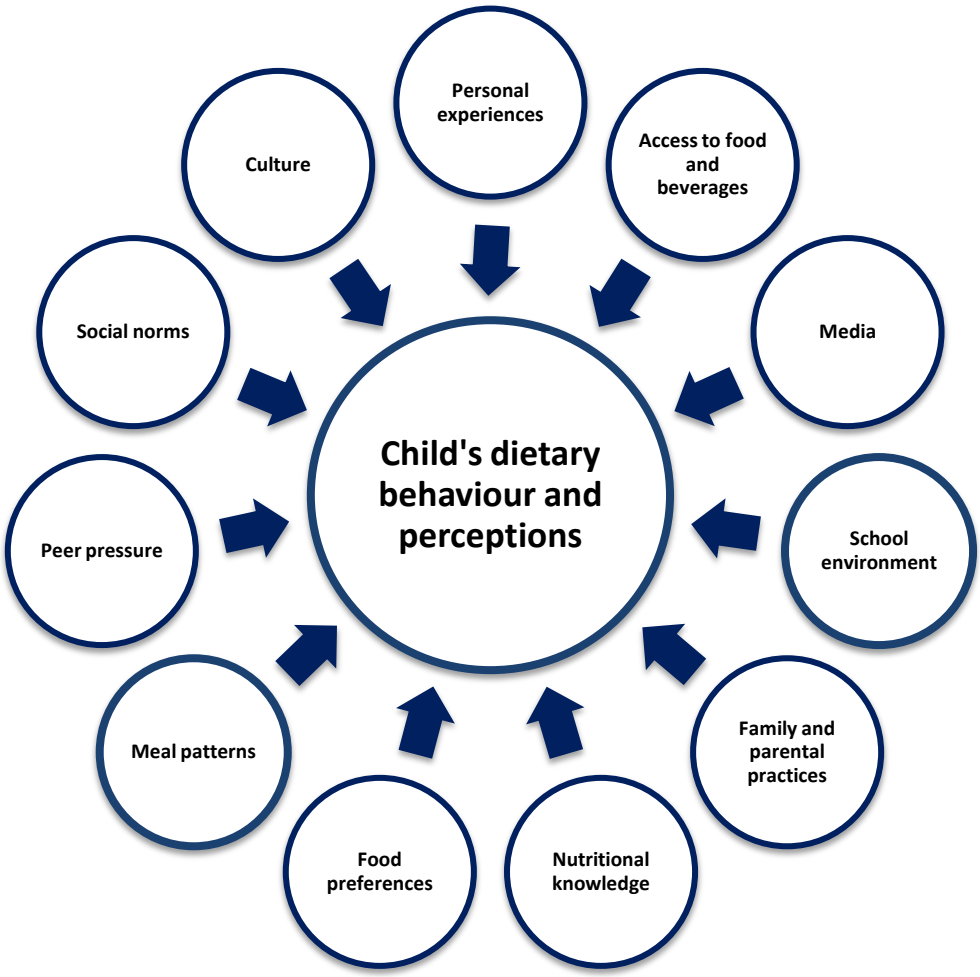

Figure 1.1: Factors that influence children's dietary behaviour and nutrition-related perceptions (adapted from references: 15, 23-28)

Fitzgerald (2010) identified three categories of factors that may influence children's food choices: **personal** factors (food preferences, taste), **socio-environmental** factors (family, food availability, peers, school environment) and **behavioural** factors (meal patterns).[27] Other factors that may also influence food choices include personal experiences, nutritional knowledge, the media and cultural and social norms.[15,26,28]

Personal factors

The pleasure of eating has been identified as a factor that influence individual's food choices, while sensory experiences, such as taste, texture and sight of food also play a role

in shaping dietary behaviour.[29,30] Fitzgerald (2010) found that personal factors such as food preferences, taste, texture, appearance and smell may play a bigger role in influencing children and adolescents' food choice than nutrition knowledge alone.[27] Pirouznia (2001) also suggest that, in addition to nutrition knowledge, food preferences and personal experiences have an effect on dietary behaviour of children.[26]

Socio-environmental factors

Access to certain types of food and the media have been regarded as socio-environmental factors that influence dietary behaviour of children.[15,23] Briefel *et al*. (2009) point out that access to either healthy or unhealthy food and beverages at home, school or in the community will influence a child's dietary intake.[15] The availability of unhealthy foods (e.g. at home or at school) promote unhealthy food choices of children, because children have a greater preference for items high in fat and sugar.[12,13,31-33] Dorey and McCool (2009) state that messages in the media may lead to misconceptions about nutrition and has a great influence on children's and adolescents' eating behaviour, nutritional beliefs and perceptions about healthy eating and body image.[23] Marketing strategies are often used to target children by showing advertisements that promote the sales of energy-dense fast foods and foods high in fat and sugar during children's television programmes.[34,35] These unhealthy food items promote overweight and obesity in children.[4,34,35] Temple and Steyn (2008) reported that 55% of advertisements shown on a South African television channel during children's programmes were for unhealthy foods, such as meals at popular fast food restaurants, refined breakfast cereals and sugar containing beverages.[35]

The involvement of parents in health promotion should be emphasised as parents play an important role in dietary behaviour and perceptions of children.[24,25] Lazarou *et al.* (2008) stated that mechanisms whereby parents influence their children's dietary habits include modelling, child-feeding practices such as restriction or restraint and the parenting style in general.[36] Powell *et al.* (2011) refer to parental practices such as pressure to eat, using food as a reward and feeding for emotion regulation that may have a negative impact on children's dietary behaviour.[37] Yung (2010) undertook a study to determine the effect of mothers' knowledge, attitude towards healthy eating and vegetable consumption on their children in primary school. It was found that children's knowledge and attitude toward

healthy eating and vegetable consumption showed significant correlations with those of their mothers.[25] According to Skouteris (2010), studies showed weight improvements in children when parents were taught about nutrition and healthy living. Childhood obesity may thus be prevented when parents are educated in this regard.[24]

Culture and other socio-environmental factors such as traditions, religious practices, ethnicity, race, social norms and peer pressure has an impact on dietary beliefs and behaviours and may influence children's eating habits, food preferences and their nutrition related perceptions.[26,28,38]

Behavioural factors

Behavioural factors may also influence children's health behaviour and their food choices.[27] These behavioural factors can range from meal times and eating patterns to factors such as having breakfast, skipping of meals, fast food consumption, timing of meals, choice of snacks and the place where the meal is eaten (e.g. at the table with family members or in front of the television).[27,39]

1.5 FACTORS NECESSARY FOR THE SUCCESSFUL PROMOTION OF HEALTH AND NUTRITION INTERVENTIONS IN THE SCHOOL ENVIRONMENT

The school environment is a socio-environmental factor that can play a role in shaping learners nutrition-related perceptions and dietary behaviour.[15,27] Schools provide access to numerous learners who spend a significant amount of time in the school environment and consume approximately a third of their daily energy requirements while at school.[10-13,40] Thus, the implementation of successful nutrition interventions at schools offer the opportunity to promote healthy eating behaviours of learners and help reduce childhood overweight and obesity.[10,12,40,41] Various factors that play a role during the promotion and support of health and nutrition interventions at schools should be considered (Figure 1.2).

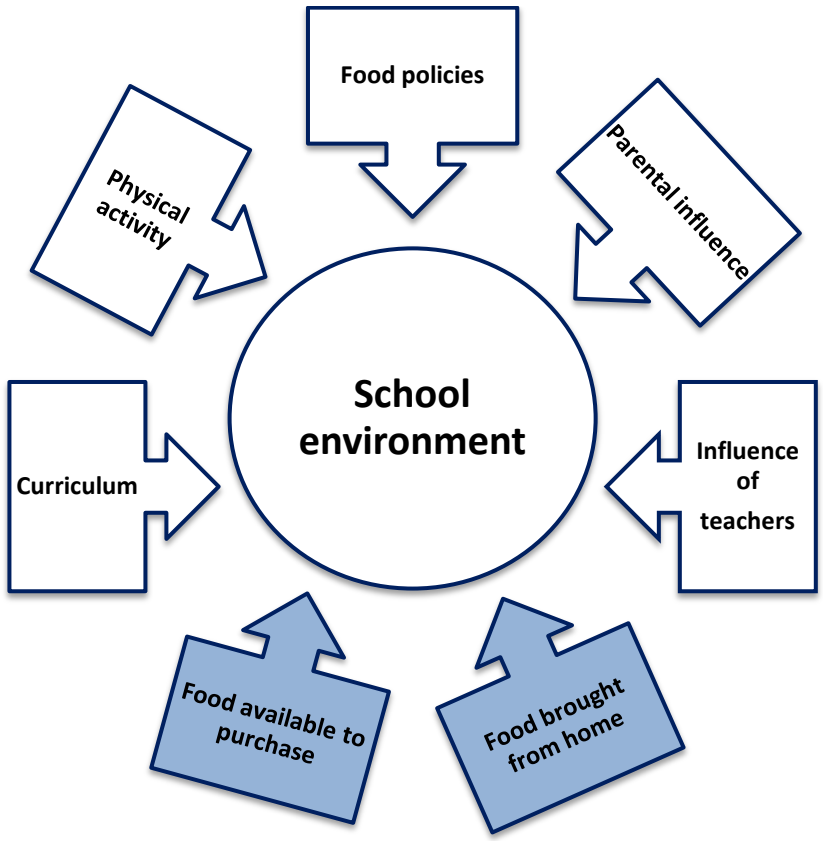

Figure 1.2: Factors necessary for the successful promotion of health and nutrition interventions in the school environment (adapted from references 2,4,11,42,43)

1.5.1 The influence of role models e.g. parents and teachers

Adults can act as role models by demonstrating the appropriate health behaviour to learners and consequently support and encourage learners to develop healthy eating behaviours.[4,11,43,44] Schools can thus promote healthy eating when school teachers and staff are involved.[11,43,44] Parents, however, also play a role in the type of food consumed by learners during school hours.[11,31] Lazarou *et al.* (2008) reported that parents' dietary behaviours and beliefs influence the dietary behaviours and beliefs of their children.[36] Studies conducted in the school environment found improved outcomes of nutrition interventions at schools when parents and families were involved.[11,44,45] A reason for the improved proposed outcomes can be that learners experience less inconsistencies of dietary practices between the home and school environment when parents are involved.[4]

1.5.2 School curriculum

Health promotion is the process of enabling people to increase control over their health and to improve their health by their changing ways of living. One of the principles of health promotion is to focus on actions that lead to positive health outcomes, rather than managing the consequences of unhealthy behaviours.[46] Health promotion may thus take place in schools, as a preventative measure.

The WHO recommends that school curriculums should be adapted to include more health and nutrition education topics through implementation of the Health Promoting Schools concept.[3,42,47] This may be a valid point, as researchers in Iceland (2010) found that an intervention programme, including nutrition education material that focused on the intake of fruit and vegetables, lead to a 47% increase in fruit and vegetable consumption in 7 to 9 year old learners.[48] Similarly in South Africa, Steyn *et al.* (2009) found that the most effective school-based nutrition interventions included a curriculum incorporating topics on nutrition and health.[11] The Integrated School Health Programme was launched in South Africa in October 2012 by President JG Zuma. This programme forms part of the National Health Insurance programme, which is in line with the WHO's call for universal health coverage around the world regardless of people's economic status.[49]

In addition to the school curriculum in South Africa educational programmes are also conducted by external stakeholders. These programs either tie in with the current nutrition curriculum or provide additional activities and assistance to teachers and some also have tuck shop guides that can be used by the schools. External stakeholders in South Africa that provide assistance to schools include the South Africa Heart and Stroke Foundation's tuck shop intervention programme, the "Making The Difference Educational Programme" from Woolworths and the Woolworths Healthy Tuck Shop Guide which was developed by dietitians in conjunction with the Sports Science Institute of South Africa, the Vitality schools programme and healthy tuck shop guidelines from Discovery Health and the Pick n Pay educational programme for primary schools. These programmes may also play a role in the promotion of health and nutrition interventions in the school environment by affecting knowledge, attitudes, perceptions and behaviours of especially primary school learners.[44,50-53]

1.5.3 Physical activity at schools

Energy expenditure by means of physical activity is essential to weight control, since an energy balance is maintained.[20] To successfully encourage children to increase their physical activity levels, Steyn *et al.* (2009), Phillips *et al.* (2003) and Draper *et al.* (2010) mentioned that physical activity programmes should be implemented in schools to establish healthy lifestyle practices and prevent overweight and obesity of learners.[11,40,44] Lien *et al.* (2010), Sangiorski *et al.* (2005) and the WHO also refer to the promotion of increased physical activity in schools.[42,54,55] Learners' participation in physical activity at schools can thus contribute to the success of nutrition interventions at schools.

1.5.4 Food available to purchase at school – popular items and the influence of gender, age and socio-economic status

Recently, the type of food, snack and beverage items supplied by school tuck shops has become a focus point for intervention, in view of the fact that meals and snacks consumed by learners during school hours provide a large percentage of their daily nutrient requirements.[2,12,14,31,41,54,56] Tuck shops at schools are usually profit driven and sell items such as packaged snacks, soft drinks and fast foods which are high in demand but unfortunately also energy dense and thus deemed as unhealthy.[16,31] Tuck shop managers may lack knowledge regarding the quality and quantity of ingredients used in the preparation of homemade tuck shop items and some show resistance to selling healthy foods due to perceived high costs and possible loss of profit.[16]

A study conducted in New Zealand by Utter *et al.* (2007) found that half of primary school children bought some or most of their food, consumed during school hours, at the school tuck shop. Also, that they were more likely to consume foods with a high fat content and high energy density and less likely to consume fruits and vegetables.[12] In South Africa, learners in primary and secondary schools mostly buy crisps, sweets, chocolates, toasted sandwiches, hamburgers, pies, samoosas (deep fried pastry with filling) and carbonated cool drinks from schools' tuck shops.[2,16,18,57] The availability and composition of unhealthy foods offered by tuck shops often have a negative influence on learners' eating habits and may limit their' ability to make healthy choices.[12,33] In addition to the availability and popularity

of tuck shop items, parents often see school tuck shops as an opportunity to "treat" their children, thus encouraging poor eating habits.[31]

Furthermore the frequency at which unhealthy tuck shop items are consumed by learners at school is alarming. A study by Temple *et al.* (2006) reported that 73% of high school children in Cape Town bought one or more unhealthy items from the tuck shop per visit, while the South African YRBS found that almost 45% of South African adolescents bought from the school tuck shop at least four times a week.[2,18] Wiles *et al.* (2011) reported that learners attending primary schools of high socio-economic status in Pietermaritzburg spend about R7.09 at their first school break and R9.14 at the second break. Grade 7 learners (oldest learners in primary schools) visited the tuck shop the most, followed by senior primary school learners in grade 4 to 6.[16] Similarly, a study by Freely *et al.* (2011) found that purchases at tuck shops by secondary school learners living in Soweto, increased with age.[57]

The influence of access, availability and cost of healthy foods in the community and at schools must also be considered since it may also play a role in learners' food choices. A study conducted by Temple *et al.* (2011) in South Africa reported that people living in the Western Cape have access to healthy foods and that these foods are available in most food stores but that the cost of the healthier options is reason for concern since healthier options may cost between 10 – 60% more per 100g than the less healthy option generally consumed by South Africans. It is important to note that the researchers concluded that a healthy diet is unaffordable for the large majority of the population.[58] Since healthy food items are expensive in South Africa, it might be expected that tuck shops will have to sell healthier options at even higher prices to maintain their profits. Therefore the cost of healthy food may prevent learners, especially those from low socio-economic areas, from buying the healthier options from tuck shops.

1.5.5 Food brought to school from home – lunchbox contents and the influence of gender, age and socio-economic status

Conway *et al.* (2002) and Regan *et al.* (2008) found that many primary school learners in the USA and New Zealand prefer to take lunchboxes to school on a daily basis.[14,41] Since learners consume approximately a third of their daily energy requirements while at school, the

content of lunchbox items can also contribute to unhealthy food intake during school hours.[10-13,40] Internationally, researchers found that unhealthy energy-dense packaged foods like chips and biscuits were common items in lunchboxes, while most sandwiches contained ingredients with a high fat content.[14,31,41,54] Interestingly, Hilsen *et al*. (2010) reported that girls in Norway consume healthy food items at school more often than boys.[59] The same was reported by Conway *et al.* (2002) who found that girls' lunchboxes contained less energy, sugar, total fat, saturated fat and cholesterol compared to the lunchboxes of boys.[14] Differences between the lunchbox contents of different age groups are also reported, with results showing poor nutritional quality intake with increasing age of primary school learners and that older primary school learners' lunchboxes contain more fat and cholesterol than those of younger learners.[14,41]

In South Africa, Temple *et al.* (2006) reported that even though 50% of learners brought food to school in their lunchboxes, it contained unhealthy food items and they bought additional unhealthy food items at school.[2] The impact of household income level and age on lunchbox usage and contents has also been described. Adolescents attending schools in areas with a high socio-economic status in Cape Town, were twice as likely to bring food to school compared to those attending schools of low socio-economic status.[2] With regards to differences between age groups, a study by Freely *et al.* (2011) found that lunchbox usage by adolescents living in Soweto decreased with age.[57]

1.5.6 School food policies

From the above information a strong case can be argued that schools can promote positive health behaviour by adopting an appropriate school food policy.[10,12,41,56] In the USA a national school wellness policy was implemented in the 2006-2007 school year, with the goal to reduce childhood obesity by promoting a healthy school food environment.[5,60] A study undertaken by Kubik *et al.* (2010) found that this school policy increased the availability of healthy foods in schools in the USA and encouraged children to make healthier food choices.[61] A school food policy may stipulate the nutritional standards for food consumed during school hours, including food sold at school and food brought from home in lunchboxes (e.g. limited intake from foods high in fat and salt and beverages high in sugar) and specify requirements for vending machines and school snack bars/tuck shops

(e.g. unhealthy foods must be replaced with milk, yogurts without added sugar, water, fruit juices without added sugar, sandwiches, fruits, nuts or vegetables). Furthermore a school food policy can also give instructions to food vendors near schools about the nutritional standards of food that they may sell to learners.[4] Lastly, the policy may also control the type of advertisements that may be placed on school grounds and on school stationery and ensure that appropriate sponsorship of equipment, events or teams must be obtained that does not encourage learners to consume unhealthy food and beverage items.[4,11,14,31]

According to the Healthy Active Kids South Africa 2010 Report Card - a report which highlights the current health status of South African children and youth - there are currently no tuck shop policies in South Africa. The report does state, however, that the South African Department of Health is in the process of developing such a policy for schools.[62]

1.6 CONTROLLING THE AVAILABILITY OF UNHEALTHY FOOD AT SCHOOL

The unhealthy foods and beverages that are available in school tuck shops may encourage unhealthy eating habits of learners and cause weight gain.[13,15,31,32] Therefore, positive health behaviour of learners should be promoted by regulating the types of food available to purchase at schools.[10,12,41]

Several researchers are of the opinion that the availability of foods high in fat and sugar influence learners' choices, since children usually tend to choose unhealthy items instead of healthier foods.[13,31-33] Templeton (2005) found that the availability of unhealthy foods in school cafeterias, vending machines and tuck shops promote unhealthy food choices and similarly Kubik *et al.* (2003) found that the use of snack vending machines negatively correlated with fruit consumption.[13,32] The management of the types of foods that are available at schools can thus play an important role in promoting healthy eating habits among learners.

In order to reduce the consumption of unhealthy foods and beverages, access to these foods could be limited in schools by increasing the availability of healthy food and beverages that are high in micronutrients and low in fat, sugar and salt, enabling children to make healthier food choices.[4,15,63] According to the Dietary Reference Intakes the daily dietary intake for children aged 4 to 13 years should provide 25-35% of total energy from fat, less

than 25% of total energy from sugar and 26-31 g of fibre per day.[64] Temple *et al.* (2006) classified fruit, fruit juice, milk, nuts and brown bread as healthy items that children should consume while at school.[2] Wiles *et al.* (2011) reported that an average healthy tuck shop snack item contains about half the amount of energy of an unhealthy snack (465kJ vs. 806kJ), is low in fat (1.2g vs. 10.2g) and high in fibre (3g vs. 1.4g), while the average healthy beverage is lower in energy (350kJ vs. 448kJ) and does not contain any added sugars or cholesterol compared to the unhealthy beverages.[16]

Schools can therefore replace energy dense snacks with healthy alternatives such as milk, yoghurt without added sugar, water, unsweetened fruit juices, sandwiches, fruits, nuts and vegetables.[4,5] Children should also be encouraged to bring similar food items to school in their lunchboxes.[2] Kakarala *et al*. (2010) suggest that sales of these healthy foods and beverages should also be promoted in order to prevent a decrease in revenue for tuck shop owners.[5]

1.7 MEASURING LEARNERS' PERCEPTIONS, ATTITUDES AND BEHAVIOUR

Different quantitative and qualitative research techniques can be employed to investigate primary school learners' perceptions, attitudes and behaviour towards healthy eating. Self-administered questionnaires and the use of questionnaires with Likert- and smiley face scales, as well as, focus group discussions are some of the methods regularly employed when measuring children's perceptions, attitude and behaviour.[39,65-71]

1.7.1 Self administered questionnaires

A questionnaire survey is a useful way to collect data from a population that is too large in order to study each individual.[72] Self-administrated questionnaires can be completed anonymously and since respondents complete the questionnaire by themselves, the answers are not affected by interviewer variation. One of the advantages of questionnaire administration is that it is a good method for obtaining and measuring attitudes and opinions of a study population. Another advantage is that questionnaires can be used for descriptive, explanatory and exploratory purposes. Self administrated questionnaires are also relatively inexpensive and less time consuming than other methods of data collection.[72]

Disadvantages are that this type of questionnaire can only be used on respondents who are literate and the researcher also has little control over data quality. The researcher must thus ensure that the questions are clear and the questionnaire must be well laid out.[73]

1.7.1.1 The use of self administered questionnaires with learners

A summary of several research studies making use of self-administered questionnaires indicate the main reason(s) why this specific method was deemed suitable for use in primary school learners (Table 1.1).

Table 1.1: Summary of research using self-administered questionnaires in learners

Researcher and Country	Number of children and age groups	Type of questionnaire and purpose	Suitability of the method
Peltzer & Pengpid, 2010[65] (Seven African countries*)	17,656 school learners: between ages 13 to 15 years	Self-administered questionnaire addressed the leading causes of morbidity and mortality among children and adults worldwide.	The tool helped to determine health behaviour by assessing learners' fruit and vegetable consumption.
Akman *et al.*, 2010[39] (Turkey)	625 school learners: between ages 11 to 15 years	Self-administered questionnaire called *Questionnaire of eating patterns.*	The data obtained from the questionnaire was useful to describe learners' health behaviours such as eating patterns.
Lai-Yeung, 2010[69] (Hong Kong)	836 school learners: between ages 11 to 18 years	Self-administered questionnaire that assessed food knowledge, eating attitudes and behaviour, perceptions of cooking skills and body weight, and related factors that influence food choice.	The questionnaire successfully determined learners in Hong Kong's food knowledge, their eating attitudes and behaviour, perceptions of cooking skills and body weight and factors that influence food choices.
Wilson *et al.*,2008[70] (Australia)	134 school learners: between ages 10 to 12 years	Self-administered questionnaire provided information on dietary patterns, behaviours, attitudes and knowledge associated with healthy eating.	The questionnaire is a valid and reliable tool to assess dietary patterns of Australian school learners aged 10 to 12 years.
Stevens *et al.*,1999[71] (USA)	516 school learners: between ages 8 to 11 years	Self-administered questions that assessed physical activity, diet, weight-related attitudes and cultural identity.	Young learners answered negatively worded questions incorrectly. This is a culturally appropriate tool to assess knowledge, attitudes and behaviours in American Indian children.

*Botswana, Kenya, Senegal, Swaziland, Tanzania, Uganda, Zambia

The information summarised in Table 1.1 shows that self-administered questionnaires are widely used across the world to assess learners' perceptions, attitudes and behaviour. These studies involved large numbers of learners and targeted children from the age of 8 and above.

As Stevens indicated that young children answered negatively worded questions incorrectly, alternative types of questionnaires, such as the smiley face response scale, might be of value when conducting research with younger children.[71]

1.7.1.2 Likert - and smiley face response scales

The Likert scale, named after Rensis Likert who developed this method, is a response format which is widely used in questionnaires.[21,25,74-76] In a 5-point Likert scale, the range of responses to a question can, for example, include strongly agree, agree, do not know, disagree and strongly disagree.[21,68,77,78] Raaijmakers *et al.* (2000) is of the opinion that the use of Likert scales with midpoint response categories, such as "I do not know" can have value since such a response could indicate that the learner would like to give a response but is not able to express a definite opinion.[79] The Smiley face scale is an adaption of the Likert scale, which uses a set of facial expressions ranging from very happy to very sad faces instead of text (Figure 1.3).[77,80]

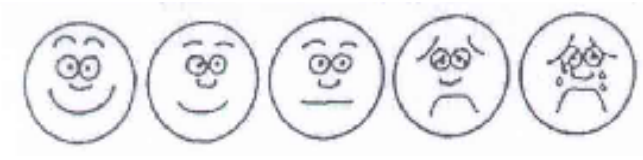

Figure 1.3: Smiley face scale[80]

The Likert- and Smiley face scales have been successfully implemented in research measuring learners' perceptions, attitudes and behaviour (Table 1.2).

Table 1.2: Summary of research using Likert scales in learners

Researcher and Country	Number of children and age groups	Type of questionnaire and scale used	Suitability of the method
Choi *et al.*, 2008[21] (Seoul)	439 school learners: between ages 11 to 14 years.	5-point Likert scale: Questionnaire investigated learners' nutrition and diet related attitude.	The 5-point Likert scale can be used in learners between the ages of 11 to 14 years to determine their nutrition and diet related attitude.
Pirouznia, 2001[26] (USA)	532 school learners: between ages 11 to 13 years.	3-point Likert scale was used for 11 year old learners; 5-point Likert scale was used for 12 to 13 year old learners: Questionnaire measured the relationship between eating behaviour and nutrition knowledge.	The instrument is a reliable and valid tool to measure the relationship between eating behaviour and nutrition knowledge of learners.
Eser *et al.*, 2008 [74] (Turkey)	1,918 school learners: between ages 8 to 12 years.	5-point Likert scale: Questionnaire assessed learners' perception of health status.	The questionnaire is a reliable and valid assessment of learners' perception of health-related quality of life.
Pell and Manganye, 2007 [75] (South Africa)	137 school learners: between ages 10 to 11 years.	Combination of 5- and 3 point Likert scales of smiley faces: Questionnaire measured learners' attitude towards science.	The questionnaire used is a reliable 'science enthusiasm' scale.

Table 2.2 gives an indication of the suitability of the use of Likert scales in children aged 8 to 14 years old. Five point Likert scales might not be suitable for children of all age groups since a less complex 3-point Likert scale was used by Pirouznia (2001) for learners younger than 12 years old.[26] Similarly a study by Detmar *et al.* (2006) also found that younger children, aged 8 to 9, prefer Likert scales with three choices.[68]

Reynolds-Keefer *et al*. (2009) studied the use of three types of Likert scales, namely text, smiley faces and faces depicted as suns and clouds in 6 to 8 year old learners in the USA. The findings of this study showed that Likert scales using different pictures did not show variability in children's responses.[81] A study by Davies and Brember (1994) investigated British school learners' attitude towards school by using the smiley face scale. The test-retest reliability coefficients were 0.71 and 0.87 for the different age groups. The results confirmed that the smiley face scale is a valid and reliable instrument for testing the perceptions, attitudes and behaviour of learners aged 6 and 10 years old.[77] As shown in Table 1.2, Pell and Manganye (2007) also used the smiley face scale for learners aged 10 to 11 years.[75]

1.7.2 Focus group discussions as a data collection method

Per definition a focus group involves a number of participants meeting in a group to discuss a topic, under the guidance of a facilitator, in order to explore the attitudes, perceptions and opinions of the participants on a prearranged topic.[66,82,83] Focus group discussions are necessary when research questions require discussion and can be used to gain insight about the individuals in the group's behaviour, in this case, health behaviour.[66] The group is stimulated by the discussion and produce data rich in detail which is difficult to achieve with other methods. The sample for focus groups is selected purposefully and should represent the target population, while keeping in mind factors such as age, gender, race and school grade (in the case of learners).[83] More than one focus group discussion per study is recommended; three to five for example.[72,83] Ideally a focus group consists of 6 to 10 participants plus a facilitator and an observer or recorder.[66] Clark (2009) recommends smaller focus groups with six to eight participants for novice facilitators.[84]

Focus group discussions have a few limitations. One of them can be peer pressure within the group, which may prevent some of the participants from saying what they believe.[66] Domination by a few outspoken individuals is also possible. A balance between too much control and too little control must be strived for. The challenge is always to encourage discussion and to maintain focus at the same time.[83]

As with other qualitative data collection methods, it is important for the researcher or assistant to take notes, record the proceedings and capture non-verbal cues for example body language, facial expressions and other interactions. An important characteristic of focus group discussions is that oral data is actually combined with observational data.[83] The observation of interaction in a group within limited time is often described as one of the main advantages of focus groups.[72] The use of an assistant who takes notes and records observations can add value to the data collection process and enhance the credibility of the research.[83]

1.7.2.1 Focus groups discussions with learners

Several researchers agree that focus groups are useful to explore learners' views on health-related matters.[67,68] Fitzgerald (2010) reports that results from focus groups have high face validity and may be used for the development of intervention programmes.[27] McKinley *et al.* (2005) conducted focus group discussions in a study in Northern Ireland and England with learners aged 11 to 12 years to investigate their views about food and nutrition, as well as factors that influence their food choices and eating behaviours. In this study, groups consisted of 10 to 12 learners and each session lasted 30-40 minutes.[67] Detmar *et al.* (2006) conducted focus group discussions with 8 to 17 year old European learners with the purpose to construct a pilot questionnaire. The focus groups consisted of 4 to 8 participants, who exchanged their views on health matters.[68]

1.8 CONCLUDING STATEMENTS ON LITERATURE REVIEW

In South Africa 30% of children between the ages of 1 and 9 and 25% of adolescents are either overweight or obese.[17,18,22] Overweight children have a greater chance to become overweight or obese adults with the risk of developing NCDs such as cardiovascular diseases, type 2 diabetes mellitus, muscoskeletal disorders, fatty liver disease and cancer.[7,19]

Early intervention during childhood is needed to reduce the incidence of NCDs.[6,7,10] To facilitate early intervention, schools can serve as a supportive environment for the promotion of healthy eating.[10,11] Foods and beverages sold at school tuck shops are often high in fat and sugar, while lunchboxes often contain unhealthy food items.[2,4,12,14,31,41] To increase learners' intake of fruit and vegetables, the availability of unhealthy foods should be restricted.[13,31,32] School nutrition policies and tuck shop guidelines should also be developed and implemented to support healthy eating habits.[10,11,39,48]

Various factors influence learners' health behaviour and nutrition-related perceptions. An understanding of these factors may help to plan successful health and nutrition interventions.[15,23-27] Likert and smiley face scales in self-administered questionnaires can successfully measure children's perceptions, attitudes and behaviour while focus group discussions can be used to explore children's attitudes, perceptions and opinions of health related matters.[39,65-71]

1.9 PROBLEM STATEMENT AND MOTIVATION FOR THE STUDY

A paucity of data exists in current literature describing perceptions, attitudes and behaviour of South African primary school learners towards healthy eating. The availability of unhealthy food items in South African school tuck shops promotes unwanted food choices since learners tend to choose foods high in fat and sugar if they are available. Managing the availability of unhealthy foods at schools is one component necessary for successful health interventions at schools. By limiting access to unhealthy foods and offering healthy food and beverages in school tuck shops, the types of food available to purchase during school hours are controlled. The impact of this single component on the school food environment has not yet been investigated.

This study aimed to investigate primary school learners' perceptions, attitudes and behaviour towards healthy eating by comparing a school that mainly offers healthy food items in the tuck shop (nutritionally-regulated tuck shop) to a school that mainly offers unhealthy food items in the tuck shop (conventional tuck shop). Findings from this study should reveal valuable information regarding the influence of a nutritionally-regulated tuck shop on primary school learners' perceptions, attitudes and behaviour towards healthy eating. If the nutritionally-regulated tuck shop has a positive influence on learners' eating behaviour and their health and nutritional-related attitudes and perceptions, the concept may be extended to other schools to enhance healthy eating among South African school learners. The availability of healthy food during school hours may help learners to develop healthy eating behaviours from a young age and thus prevent them from becoming overweight and obese and developing NCDs.

1.10 CONCEPTUAL FRAMEWORK

The conceptual framework gives a schematic overview of this study by showing the inputs, influential factors and hypothesised outcomes on which this study is based (Figure 1.4).

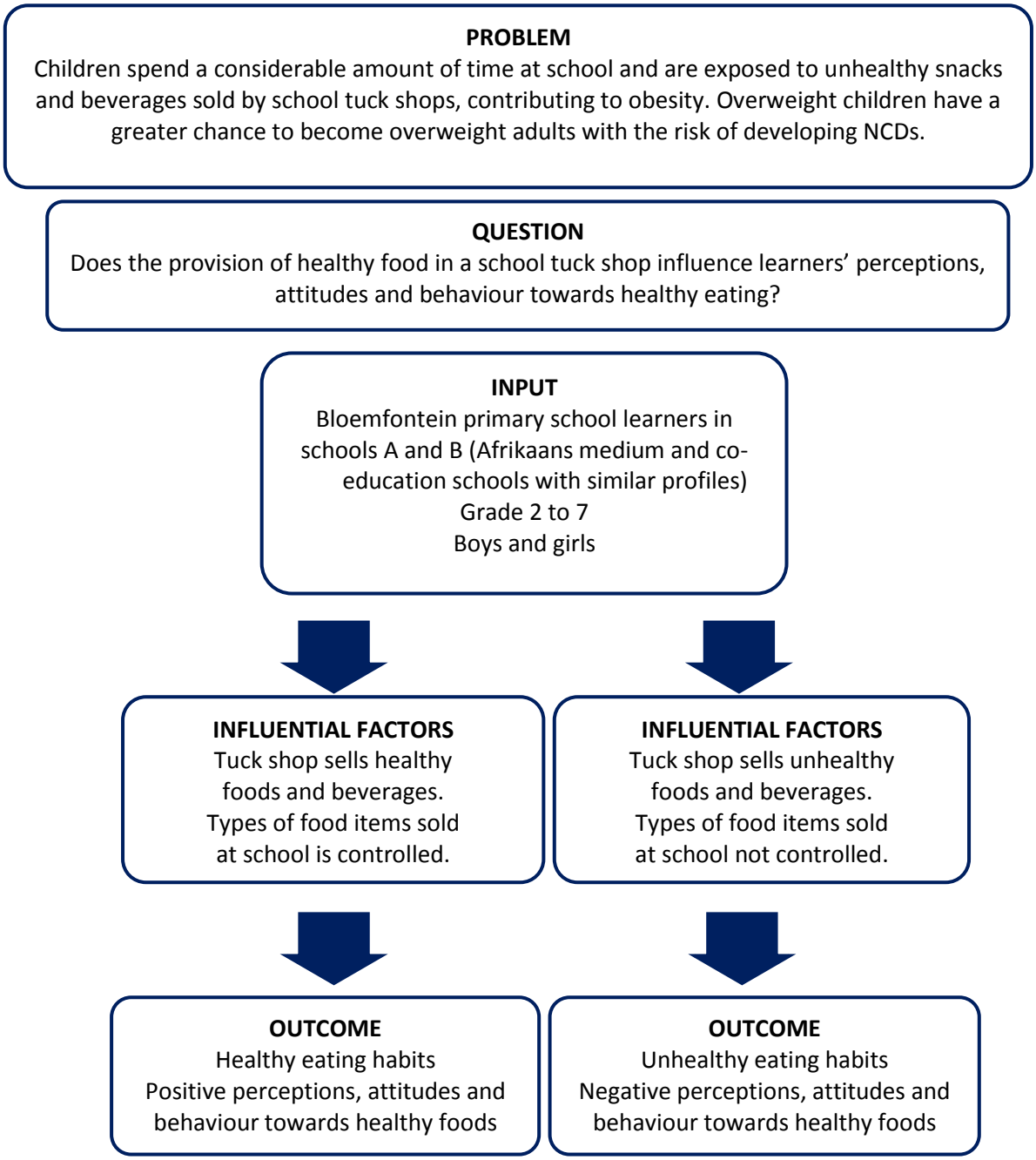

Figure 1.4: Conceptual framework of the study

CHAPTER 2: METHODOLOGY

2.1 INTRODUCTION

This study investigated the influence of a nutritionally-regulated tuck shop on the school food environment. As discussed earlier (refer to 1.9) the management of the availability of unhealthy foods at schools is one component necessary for successful health interventions at schools. The aim of this study was to determine if a school tuck shop that offers healthy food items can promote healthy eating habits of primary school learners.

2.2 STUDY AIM AND OBJECTIVES

2.2.1 Aim of the study

The main aim of the study was to investigate the perceptions, attitudes and behaviour of primary school learners in Bloemfontein towards healthy eating by comparing a school that offers healthy food items in the tuck shop (nutritionally-regulated tuck shop) to a school that mainly offers unhealthy food items in the tuck shop (conventional tuck shop).

2.2.2 Research objectives

2.2.2.1 Main objective

- To investigate the influence of a nutritionally-regulated tuck shop on the perceptions, attitudes and behaviour of primary school learners, attending an Afrikaans medium, co-education school in Bloemfontein, towards healthy eating.

2.2.2.2 Secondary objectives

- To determine if primary school learners' perceptions, attitudes and behaviour towards healthy eating differ between a school with a conventional tuck shop and a school with a nutritionally-regulated tuck shop.
- To determine if primary school learners' perceptions, attitudes and behaviour towards healthy eating differ across different year groups and between genders.

- To establish what primary school learners bring to school in their lunchboxes and compare the nutritional adequacy thereof between a school with a conventional tuck shop and a school with a nutritionally-regulated tuck shop.
- To establish what primary school learners buy at the tuck shop.
- To determine how much money primary school learners have available to spend at the tuck shop.
- To compare the nutritional analysis of the types of food items available in the conventional tuck shop and nutritionally-regulated tuck shop.
- To make recommendations for the extension of the concept and practice of a nutritionally-regulated tuck shop to other schools based on outcome of the study.

2.2.3 Hypotheses

For the purpose of this study the following hypotheses were investigated:

- Learners in a school with a nutritionally-regulated tuck shop have positive perceptions, attitudes and behaviour towards healthy eating when compared to learners in a school with a conventional tuck shop.
- Younger learners have positive perceptions, attitudes and behaviour towards healthy eating when compared to older learners.
- Girls have positive perceptions, attitudes and behaviour towards healthy eating when compared to boys.

2.3 STUDY DESIGN

An observational study, in the form of a cross-sectional survey with an analytical component, was performed. Qualitative and quantitative research methods were used.

2.3.1 Study design overview

A mixed method approach with a triangulation type design was employed. Triangulation refers to the concept where quantitative and qualitative data are gathered during the same time frame, but data is collected and analysed separately. The purpose of such a design is "to obtain different but complementary data on the same topic".[85] The nature of this design, as applied in this study, is represented in Figure 2.1.

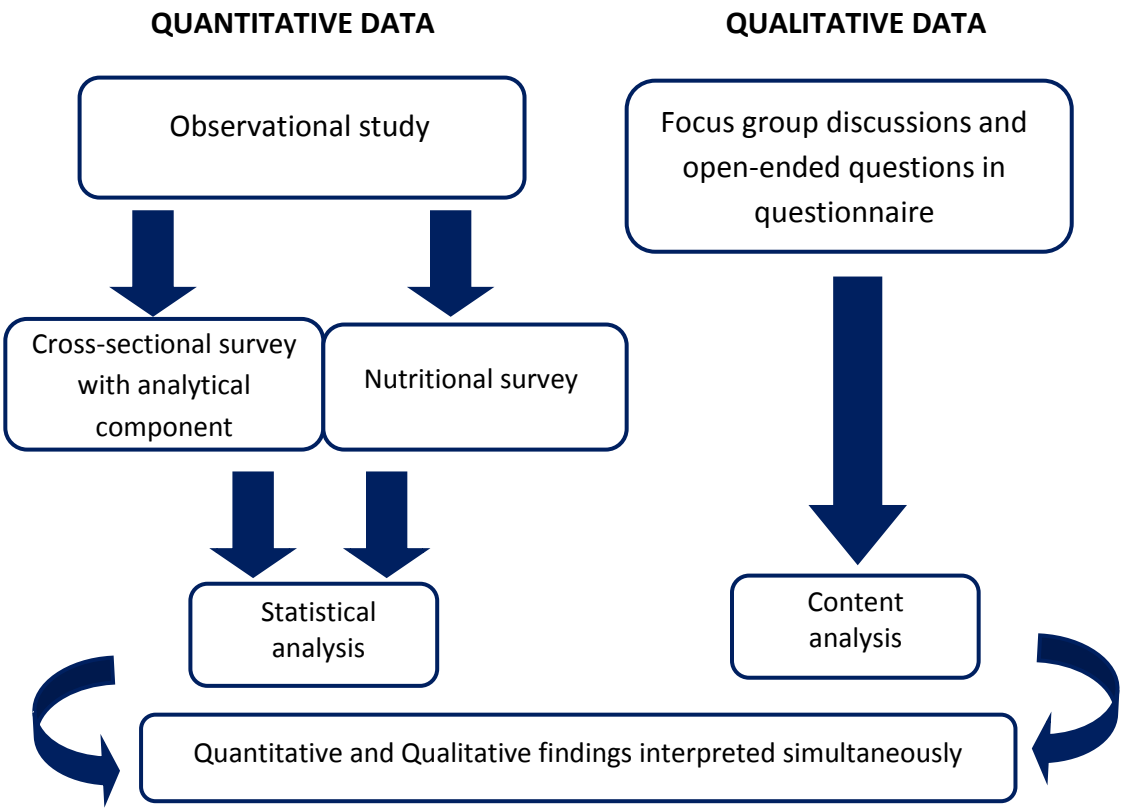

Figure 2.1 Triangulation mixed method design (adapted from reference 85).

2.4 STUDY POPULATION AND SAMPLING

2.4.1 Study population of the study

The study population consisted of learners in Bloemfontein attending Afrikaans medium co-education primary schools. Three schools were selected for the study.

The first school: School A has a tuck shop that sells mainly healthy foods and beverages. This school is located in Universitas, one of the southern neighbourhoods of Bloemfontein. It is a public co-education primary school with Afrikaans as the teaching medium.

The region of Bloemfontein, south of Nelson Mandela Drive within a radius of 4km from school A, was considered for selecting school B and school C in order to ensure that participating schools fall into the same socio-economic area of the city (Appendix A). According to the Free State Department of Education, Bloemfontein has 11 public co-education Afrikaans medium primary schools, but for the purpose of this study, qualifying schools had to be in close proximity of school A[86] i.e. within the 4 km range as indicated. To limit possible bias of the study results none of the participating schools had to be part of any educational programmes offered by external stakeholders. Thus Sand du Plessis-, President Brand-, Jim Fouché- and Fichardt Park primary schools were considered for sampling and two of these schools were selected by means of simple random sampling by drawing the schools' names from a hat:

- School B was used for the main study and compared with school A.
- School C was used for the pilot study.

A learner profile was obtained from each of the three schools to ensure that the schools were comparable, with regards to socio-economic status (neighbourhood), gender and race.

2.4.2 Sample selection in the study

Random sampling methods were also utilised in the selection of participants to prevent bias, thus a representative sample from each school was drawn.

Learners in schools A and B from grades 2 to 7 were included in the study. A list with the exact number of learners per grade, also indicating gender, was obtained from each school. The class lists were combined for each grade and these lists were used for interval sampling. Selection took place in the form of random sampling per school grade and gender to include equal numbers of learners from each year group and gender. A study sample was obtained from the school lists by selecting every 3rd male and female until 15 males and 15 females were selected in each participating grade of schools A and B.

After signed consent forms were returned, six learners (three males and three females) were selected per grade by means of random sampling from the participants in schools A and B to take part in focus group discussions. The first six learners selected for the focus group discussions who gave written assent were included in the focus groups. The sampling stages are depicted below (Figure 2.2).

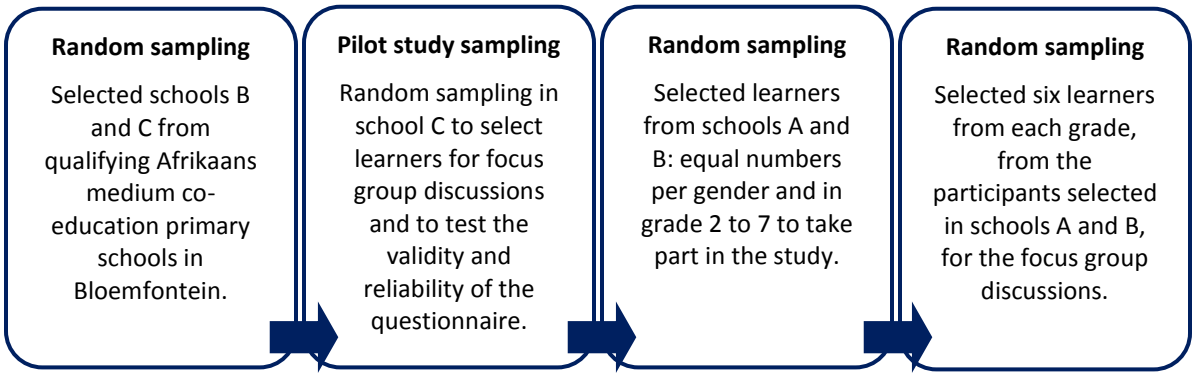

Figure 2.2: Sampling stages of selecting learners from each grade

2.4.3 Sample size

The sample size was determined with the assistance of a statistician from the University of Stellenbosch. Table 2.1 indicates the number of learners in the qualifying schools in 2009 and Table 2.2 indicates the number of learners per grade and per gender in School A in 2010.

Table 2.1: Number of learners per Afrikaans medium co-education primary school in Bloemfontein (2009)

Co-education Primary School	Number of learners
Universitas	810
Fichardt Park	1018
Jim Fouché	845
President Brand	491
Sand du Plessis	344

Source: Free State Department of Education (2009)[87]

Table 2.2: 2010 Statistics for the number of learners per grade and gender in school A

Grade	Number of learners	Male	Female
Grade 2	126	68	58
Grade 3	115	45	70
Grade 4	123	56	67
Grade 5	106	36	70
Grade 6	122	52	70
Grade 7	115	54	61
Total	707	311	396

Source: Universitas Primary School[88]

The expected sample size was 240 learners, but to make provision for fall outs oversampling was used and thus a total of 30 learners (15 males and 15 females) were recruited per grade from schools A and B (Table 2.3).

Table 2.3: Expected sample size

Grade	Total number of learners from School A and B	Learners per grade in each school	Male learners per school	Female learners per school
Grade 2	40	20	10	10
Grade 3	40	20	10	10
Grade 4	40	20	10	10
Grade 5	40	20	10	10
Grade 6	40	20	10	10
Grade 7	40	20	10	10
Total	**240**	**120**	**60**	**60**

2.4.3.1 Inclusion criteria

- Primary school learners in co-education schools in grades 2 to 7.
- Learners aged 7 to 14 years.
- Learners must have been in the specific school for at least one term (3 months).
- Learners from all races.
- Written, informed consent from each learner's parent/guardian.
- Signed assent form from each learner.
- Afrikaans speaking due to the medium of education at the specific school.

2.4.3.2 Exclusion criteria

- Learners in grade 1 were excluded from the study since they would have struggled to complete the questionnaire on their own.
- Learners attending boarding school were excluded since school A did not have a hostel.

2.5 METHODS OF DATA COLLECTION

Data collection took place over two and a half days at each school for the period 24 January to 2 February 2011. On the morning of day one, the researcher and assistant completed a survey of items sold at the tuck shop at school A. After the school break, learners in grades 2 to 4 completed the questionnaire. On day two, focus group discussions were held with learners in grades 2 to 4 early in the morning, where after the researcher and assistant recorded additional items that were available in the tuck shop on that day. After the school break of the second day, learners in grades 5 to 7 completed the questionnaires. On the morning of day three, focus groups were conducted with grades 5 to 7 learners. The same procedure was repeated in School B during the following week.

The methods followed for data collection, namely questionnaire administration, focus group discussions and the collection of nutritional information of food items available at the schools' tuck shops are discussed next. To summarise the steps followed during the research study Figure 2.3 illustrates the various stages of the research process.

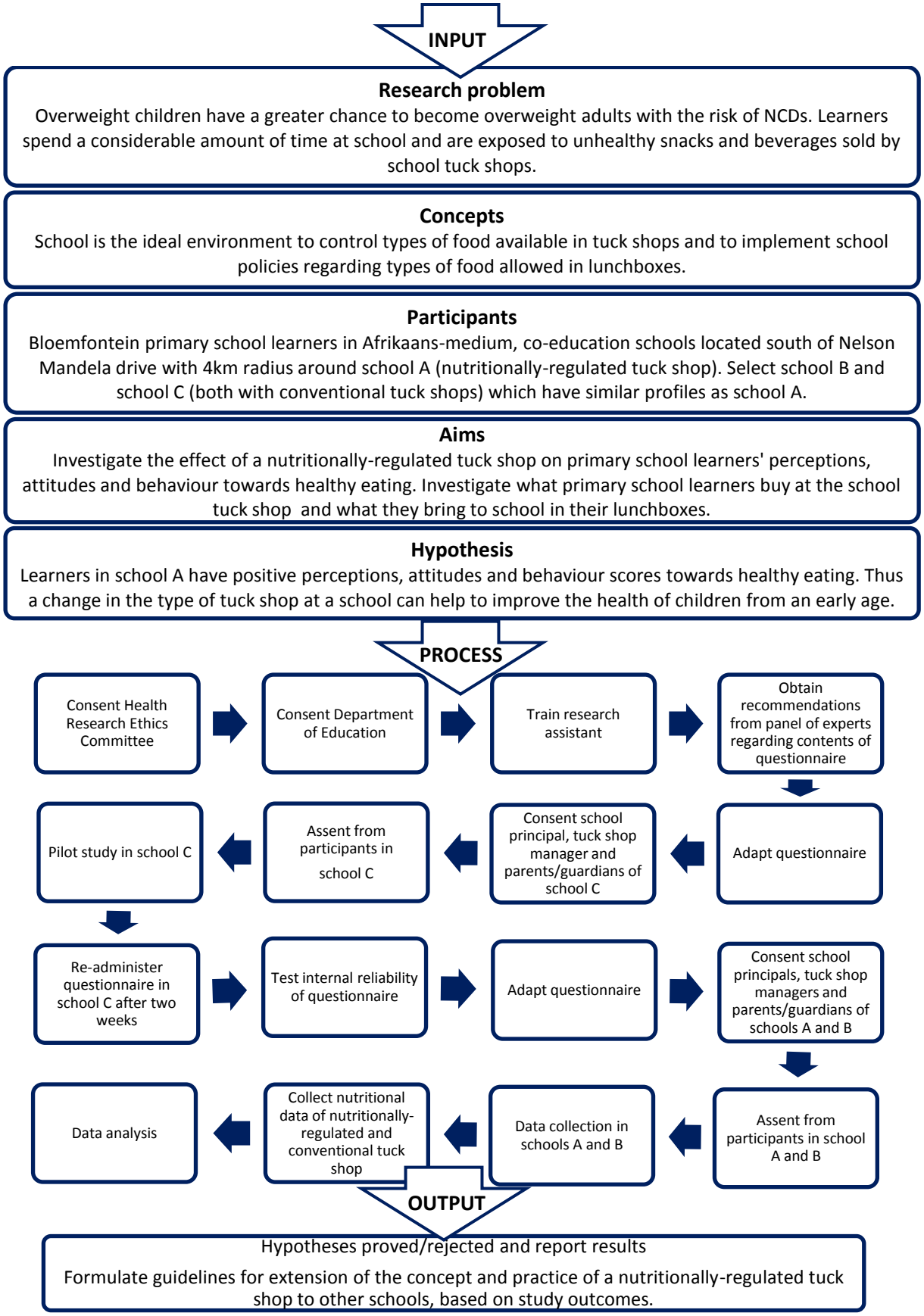

Figure 2.3: Diagrammatical depiction of the research process

2.5.1 Questionnaire administration

Questionnaire administration took place after the school break when learners could remember best what they had eaten and/or bought from the tuck shop. A classroom was used for data collection. The research assistant set out questionnaires, assent forms (Appendix B and C) and pencils with erasers at each desk before learners entered. If written parental consent was received, learners were called from their classes, per grade. The researcher welcomed them, explained the purpose of the questionnaire, as well as the procedures for completing the questionnaire. The researcher assisted the learners by reading out each question and allowing time for completion. The assistant clarified any queries and where necessary, learners were assisted without influencing their responses to the questions. The researcher thanked the learners for participating, while the assistant checked that every questionnaire was fully completed. As a small incentive, learners were allowed to keep the pencils and erasers. The completed questionnaires were put into a marked envelope and sealed. The envelope was kept sealed until the researcher opened it for data capturing.

2.5.2 Focus group discussions with learners

Selected learners, for whom parental consent forms were received, were called from their classes, per grade to take part in the focus group discussions. Learners who agreed to take part in the discussions signed the assent forms (Appendix C). The research assistant collected the forms before the discussion commenced. The focus group discussions were held during school hours in the respective schools' board rooms where learners could sit around a table and discuss the topics. Learners could communicate freely, since there were no interruptions. The discussions were facilitated by the researcher, while the research assistant took notes of the learners' interactions and their contributions to the discussion. An audio recorder was set-up to record the discussions. Before the discussion commenced, the researcher welcomed the learners, introduced herself and the assistant and explained how the discussions would proceed. Verbal permission to make an audio recording of the

discussion was asked from each group before the recorder was switched on. The researcher followed a discussion guide and helped learners to stay focused on a specific topic by asking exploratory questions without leading them (Appendix D). During the focus group discussion, the learners took part in an activity which was developed by the researcher. The group was given 16 cards with pictures of food and beverage items. The group then had to decide amongst themselves which items were healthy and which ones were unhealthy and group them accordingly.

2.5.3 Collection of nutritional information of food items available at the schools' tuck shops

The researcher and assistant used the data collection form (Appendix E) to compile a list of all snacks, food and beverages available in the schools' tuck shops. Where necessary, a calibrated portable digital kitchen scale was used to weigh items that were not labelled or if labels did not indicate the weight of the product. When food items did not have labels indicating nutritional information, recipes were obtained. If a product did not have a label and the recipe was not available, the researcher and assistant only recorded the weight of the item (see 2.8.1.2 for the nutritional analysis of tuck shop items).

2.6 PREPARATION FOR THE STUDY

2.6.1 Obtaining written, informed consent

The researcher firstly obtained written, informed consent from the Free State Department of Education (Appendix F). Subsequently the principals of the selected schools were contacted to discuss the intended research project and to obtain written, informed consent from each school principal (Appendix G). The tuck shop managers were contacted next to obtain consent (Appendix H). Parental consent forms were given to selected learners, two weeks before the study and these forms were collected from the school one week before data collection. The return of signed consent forms from both schools was very poor; therefore

the date for submission of consent forms was extended until the day of the study. Parental consent forms were available in Afrikaans, English and Sesotho to provide them with the necessary information about the research in their preferred language (Appendix I). All learners who agreed to participate completed the assent form for learners (Appendix C).

2.6.2 Standardisation of researchers

The researcher trained a research assistant to ensure that procedures followed during the study were standardised in accordance with the research protocol. The assistant had to be able to speak Afrikaans fluently, have at least a matric qualification and had to enjoy working with learners. The assistant received a training manual indicating the aims and objectives of the study, information on the participants, location of selected schools, procedures to be followed during data collection and methods to ensure validity and reliability. She was also instructed about the correct manner to conduct focus group discussions and she was provided with the discussion guide for the focus groups. The process of obtaining informed consent from parents and informed assent from learners was discussed in detail. The research assistant assisted the researcher during the focus group discussions and helped during the administration of the questionnaires.

2.6.3 Pilot study

To ensure content validity of the questionnaire four experts (two primary school teachers and two dietitians) gave recommendations regarding the relevance of the contents, the level of difficulty and the appropriateness for the target group.[89] The primary school teachers noted that learners of all age groups between grades 2 to 7 would be able to complete the questionnaire on their own, but they recommended that questionnaires should be filled in step-by-step with grades 2 and 3 learners since some of them struggle to read with comprehension. They also noted that younger learners tend to write very big and are used to writing between two lines at once. Some questions were rephrased but in general both dietitians noted that the questionnaire touched on all aspects in order to measure learners'

perceptions, attitudes and behaviour towards healthy eating. The dietitians were concerned about the word "snackwich" as they felt that all learners might not understand the word. The picture of the snackwich was therefore replaced with a picture of a pie in the final questionnaire (Appendix B).

To ensure validity and reliability of the questionnaires and processes for the main study, the researcher and assistant conducted a pilot study at school C in November 2010, where 36 learners were selected by means of random sampling. Six learners in each of the participating grades (grades 2 to 7) were recruited and learners in grade 2 and grade 4 were asked to take part in two separate focus group discussions.

The same procedures were followed as for the main study. The researcher recorded the time needed to complete questionnaires. It was determined that older learners completed the questionnaire in more or less 10 minutes while younger learners took about 20 minutes. The focus group discussions lasted between 15 and 20 minutes. The researcher and assistant kept notes of the questions in the questionnaire that learners misunderstood. The questionnaire was re-administrated to the same sample of learners after two weeks to obtain internal reliability of the questionnaire. Cronbach's alpha statistics indicated that the questionnaire is reliable for measuring attitude and behaviour. The internal reliability of the perception questions was inconsistent thus the questionnaire was adapted after the pilot study was completed and the adapted questionnaire was used for the main study (Appendix B). Phrases of questions in section D of the questionnaire was re-written so that both older and younger learners could understand them. A negatively worded question was omitted in the final questionnaire and the sequence of questions 10 to 12 was changed, since most learners were unable to mark only one choice of food, beverage and a snack for their lunchbox after marking all the fruits and vegetables that they liked in the previous questions. With the exception of the questions about pocket money and the amount spent at the tuck shop, which was removed, the focus group discussion guide was kept the same for the main study (Appendix D).

2.6.4 Validity

To assess the validity of the questionnaire, face validity and content validity were tested. Face validity is the extent to which an instrument looks like it is measuring a particular characteristic.[90] This type of validity is defined by the researcher's subjective judgement and it is an assessment of whether the question truly measures behaviour, attitude or opinion.[91] To ensure face validity, statistical results obtained from the pilot study were assessed. Content validity is a way of assessing validity by ensuring that all the components of a variable are measured.[92] To ensure content validity, the researcher asked four experts consisting to scrutinise the content of the questionnaire to determine the validity of the questionnaire for measuring the perceptions, attitudes and behaviour of primary school learners towards healthy eating.[90]

Internal validity (credibility) refers to the "trueful picture" the researcher sketches, whether it "rings true", or whether the researcher and participants would agree on the description and interpretation of what has been seen or said, i.e. a type of mutual understanding or agreement between them.[72,93] In this study, strategies to improve the internal validity included triangulation in data collection and analysis, auto recording of data and the use of participant language in reporting.[72,93] Detailed transcriptions were also made to assist with the interpretation in the data analysis process. To further ensure internal validity, an independent person was appointed to code some of the data that could be used for a comparison and verification of the coding done by the researcher.[94]

As in quantitative research, external validity in qualitative research has to do with the generalisability or the extension of the findings. Because qualitative research largely depends on the specific context or environment of the study, generalisability is not the goal, but researchers must ensure that the findings are generalisable to the target population. The careful selection of participants (random sampling in the case of this study) and detail in the description of data, are two important measures that increase the external validity.[72]

2.6.5 Reliability

In this study, several measures were taken to ensure reliability. To determine the internal reliability of the questionnaire, data obtained from the pilot study was evaluated statistically per construct by using Cronbach's alpha. Cronbach's alpha is a measure of internal consistency of the items per construct and a coefficient close to +1.00 would reflect a high internal reliability of the questionnaire.[95] To further evaluate reliability, the questionnaire was re-administrated to the same sample of learners in school C after two weeks.

In qualitative studies the researcher is the instrument of data collection and interpretation. A possible disadvantage is therefore the possibility of subjectivity and bias which has to be dealt with.[72,93] The detailed records kept of the data collected and the data analysis procedure was an additional measure for ensuring reliability. All these measures assisted in addressing possible researcher bias and subjectivity.

2.7 RESEARCH INSTRUMENTS

Three research instruments were used for data collection. These are the questionnaire, the focus group discussion guide and the data collection form used for the collection of nutritional information of the tuck shop items.

2.7.1 Questionnaire development

Learner's perceptions, attitudes and behaviour towards healthy eating were investigated by means of a self-administrated questionnaire developed by the researcher. The questionnaire was based on the research objectives of the study and current literature and adapted after valuable suggestions were made by four experts. The questionnaire was only available in Afrikaans, since Afrikaans is the teaching medium at the selected schools.

The questionnaire had four sections (Appendix B). Section A consisted of eight close-ended questions regarding socio-demographic information, as well as the amount of money spent at the tuck shop and the frequency per week that items were bought from the tuck shop.

Learners were asked to select only one answer for each question. Section B consisted of three close-ended questions about lunchbox contents. Answers to questions in this section indicated specific eating behaviours of learners. Section C consisted of four open-ended questions regarding the food bought at the tuck shop on the day of data collection, foods sold by the tuck shop that the learner liked and disliked, and a question asking which other foods the learner would like to have available in the tuck shop. Section C provided information on behaviour (type of foods bought) and attitude towards the types of foods available in the tuck shop. Learners were asked to write their answers on the open space provided. Section D (questions 1 to 9) evaluated perceptions and attitudes (Table 2.4). In this section a three-point Likert scale with smiley faces was used to help clarify the research questions. Literature shows that younger learners prefer Likert response scales with three choices instead of five.[68] Section D (question 10 to 12) was illustrated by using pictures. The learner was asked to mark which food, beverage and snack he/she would pack into his/her own lunchbox (question 10), and then to mark all the fruits and vegetables that he/she liked (questions 11 and 12).

Table 2.4: Questions related to perceptions and attitudes

Children who eat breakfast are clever.	Perception
Sweet stuff can make children fat.	Perception
The tuck shop must not sell sweets and cool drink.	Attitude
I would rather buy a fresh fruit than sweets from the tuck shop.	Attitude
Children must first eat healthy food before they can have sweets.	Perception
I like the taste of vegetables.	Attitude
I like to drink milk.	Attitude
Fatty foods are not healthy for children.	Perception
I must only eat small amounts of tuck shop food, such as pies and chips that make my hands oily.	Perception

2.7.2 Discussion guide for focus groups

Focus group discussions were conducted to explore the perceptions, attitudes and behaviour of learners in a school with a nutritionally-regulated tuck shop and learners in a school with a conventional tuck shop. The researcher developed a discussion guide for the focus groups discussions based on topics such as eating habits, types of food available in the school tuck shop that are liked/disliked, the types of food that are healthy and unhealthy (Appendix D). The first questions on the discussion guide were general questions which allowed learners to relax and understand the procedure, before starting with the discussions on the selected research topics. During the discussion the learners also took part in an activity, developed by the researcher, where they had to work together to sort pictures of 16 items into healthy and unhealthy categories. The purpose of this activity was to test the different grades' perceptions about certain food items. The results of the activity were summarised in a table. A tick (✓) indicated that the group perceived the item as healthy, whereas a cross (x) meant that they perceived it as unhealthy. The researcher compared the results of the activiity between the two schools and between the grades in each school.

2.7.3 Collection of nutritional information of tuck shop items

The researcher and assistant compiled a list of all snacks, food and beverages available in the schools' tuck shops using a data collection form (Appendix E).

2.8 DATA ANALYSIS

2.8.1 Quantitative data analysis

Quantitiative data was collected by means of the self administered questionnaire and by the nutritional survey of the tuck shops.

2.8.1.1 Data analysis of questionnaire

Data from the questionnaires was captured using MS Excel (Appendix J) and STATISTICA version 10 was used to analyse the data.[96] A statistician appointed by the Faculty of Medicine and Health Sciences, University of Stellenbosch, analysed the quantitative data by making comparisons between school A and school B. Analyses for each grade were also done where every grade in school A was compared with the same grade in school B. Males and females in school A were compared with males and females in school B, respectively. Finally, analyses between the year groups and genders in each school were also made.

The following summary statistics were used to describe the observed variables. Distributions were presented with histograms and/or frequency tables. Medians or means were used as measures of central location for ordinal and continuous responses and standard deviations and quartiles as indicators of spread. Relationships between two continuous variables were analysed with regression analysis and the strength of the relationship measured with Pearson correlation or Spearman correlation when continuous variables were not normally distributed. The relationships between continuous response variables and nominal input variables (like different diets) were analysed using appropriate analysis of variance (ANOVA). When ordinal response variables were compared versus nominal input variables, non-parametric ANOVA methods were used. For completely randomized designs the Mann-Whitney test or the Kruskal-Wallis test were be used and for repeated measures designs the Wilcoxon- or Friedman tests. The relation between nominal variables was investigated with contingency tables and the likelihood ratio chi-square test.

A p-value of $p < 0.05$ represented statistical significance in hypothesis testing and 95% confidence intervals were used to describe the estimation of some unknown parameters.

2.8.1.2 Nutritional analysis of tuck shop items

Food items were analysed by either using the nutritional information on the packaged items or by using Food Fundi computer software, version 2 to determine the nutritional content of items that were not commercially packaged and labelled.[97] The nutritional content (energy,

macronutrients and micronutrients) of the typical foods, snacks and beverages available from each tuck shop were summarised in tables. The researcher also compiled a comparison table of the most popular foods, snacks and beverages in order to compare the energy and macronutrient content of these items.

2.8.2 Qualitative data analysis

This study had two sets of qualitative data, namely data from open-ended questions and data from focus group discussions.

2.8.2.1 Qualitative analysis of open-ended questions

Section C of the questionnaire consisted of four open-ended questions about the tuck shop (Appendix B). Learners had to write down which items they liked, disliked and bought from the tuck shop and they had to make suggestions for other items that they would like to have available in the tuck shop. Learners' reponses to these questions were sorted into categories by making use of inductive coding, whereby the researcher used categories as they emerged from the data.[86] The results of the open-ended questions were summarised in an MS Excel sheet in order to calculate the percentage of units that fall into each category.[98]

2.8.2.2 Qualitative analysis of focus group discussions

The main steps in qualitative data analysis include the following: transcribing the data; getting to know the data by reading repeatedly; coding the data; establishing themes or categories; interpreting the data; drawing findings and conclusions.[94] The researcher transcribed recorded data, including audio recordings, notes made by the assistant during focus group discussions, as well as, non verbal cues. Content analysis was performed by the researcher on all of the transcripts. The researcher read and re-read each transcript until the researcher became familiar with the content. Thereafter the complete transcripts were summarised, question-by-question for each focus group, with emphasis on identified

perceptions, attitudes and behaviour. Meaningful segments of data was coded by using pre-determined or deductive coding.[94] The researcher used a second person to separately undertake some of the coding for the purposes of comparison. Since this research study aimed to identify perceptions, attitudes and behaviours, the pre-determined codes that were used included: P (perceptions), A+ (positive attitude), A- (negative attitude), B+ (positive behaviour) and B- (negative behaviour).

2.9 ETHICS AND LEGAL ASPECTS

2.9.1 Ethics committee

Permission to perform the study was obtained from the Health Research Ethics Committee at the Faculty of Medicine and Health Sciences, Stellenbosch University (Ethics reference number N10/08/246).

2.9.2 Authorisation

The necessary permission to perform the study was obtained from the Department of Education in the Free State, the principals of the three primary schools and the tuck shop managers (Appendix F, G and H).

2.9.3 Informed consent

Parent(s)/guardian(s) of each learner received an information sheet and consent form two weeks before the date of the data collection, which they could sign and return to the school within a week if permission to participate in the study was granted (Appendix I).

All participating learners were supplied with an assent form on the day of data collection to explain the purpose of the questionnaire completion and focus group discussions (Appendix C). The learners were given time to read the assent form and sign the form if they wished to participate in the study. Participation was voluntary and learners could refuse

participation during any part of the data collection process, although no learners declined to take part after assent forms were signed.

2.9.4 Participant confidentiality

Questionnaire information was treated confidentially and filled out anonymously. A unique identifier code was allocated to each learner and each school for the capturing and processing of data. None of the schools' names will be revealed and information will remain accessible only to the researcher and the statistician. Learners were informed that all questionnaires had to be filled out anonymously. The research assistant collected the signed assent forms before data collection started and kept it in a sealed envelope.

2.9.5 Benefit of participation

It was expected that findings from this study would reveal valuable information regarding the influence of a nutritionally-regulated tuck shop on the school food environment and the effect of such a tuck shop on primary school learners' perceptions, attitude and behaviour towards healthy eating. Learners spend a considerable amount of time at school and thus controlling the types of food available can have an impact, by exposing learners to and teaching them about healthy foods. The potential benefits offered by a nutritionally-regulated tuck shop may benefit the participating learners, their co-learners and prospective learners since this change in the school environment may be a step forward to reduce childhood obesity and risk factors for NCDs. Possible benefits from the study results will be shared with the participating schools, the Department of Education and dietitians.

CHAPTER 3: RESULTS

3.1 INTRODUCTION

The aim of this study was to investigate the perceptions, attitudes and behaviour of primary school learners in Bloemfontein towards healthy eating by comparing a school with a nutritionally-regulated tuck shop (school A) to a school with a conventional tuck shop (school B). A mixed method design was followed; quantitative, as well as, qualitative methods were used in the data collection process. The researcher used three data collection methods, namely a questionnaire, focus groups discussions and the collection of nutritional information and nutritional analysis of foods, snacks and beverages available in the tuck shops.

This chapter follows a systematic approach to present the results from 257 questionnaires, 12 focus group discussions (6 learners per group) and the nutritional information of the two tuck shops collected from two Afrikaans medium, co-education primary schools in Bloemfontein. Quantitative and qualitative results are integrated and presented in line with the secondary objectives for this study. The school with the nutritionally-regulated tuck shop is referred to as school A, while the school with the conventional tuck shop is referred to as school B.

3.2 SOCIO-DEMOGRAPHIC INFORMATION OF LEARNERS

At school A 116 learners completed the questionnaire, while 141 learners completed the questionnaire at school B. In both schools, more girls (62.1% in school A, n=72; 60.3% in school B, n=85) participated compared to the number of boys (37.9% in school A, n=44; 39.7% in school B, n=56). The home language of the majority of learners was Afrikaans (94.8% in school A, n=110; 97.9% in school B, n=138) and most learners lived in areas surrounding the particular school, i.e. Universitas and Langenhoven Park (school A) and Fichardt Park (school B) (Table 3.1). The suburbs of Universitas, Langenhoven Park and Fichardt Park are situated in the south-western region of Bloemfontein (Appendix A) and can be regarded as middle class areas since these do not fall into the category of affluent

suburbs found in the north of the city or poor and previously disadvantaged communities more towards the south-eastern part of the city.[99]

Table 3.1: Socio-demographic information of grade 2 to 7 learners in a school with a nutritionally-regulated tuck shop and a school with a conventional tuck shop(n=257).

	School A* n=116	%	School B** n=141	%
Boys	44	37.9	56	39.7
Grade 2	5	4.3	5	3.5
Grade 3	10	8.6	9	6.4
Grade 4	5	4.3	15	10.6
Grade 5	9	7.8	4	2.8
Grade 6	7	6.0	14	9.9
Grade 7	8	6.9	9	6.4
Girls	72	62.1	85	60.3
Grade 2	5	4.3	14	9.9
Grade 3	10	8.6	15	10.6
Grade 4	15	12.9	14	9.9
Grade 5	13	11.2	15	10.6
Grade 6	15	12.9	15	10.6
Grade 7	14	12.1	12	8.5
Age groups				
7 years	9	7.8	16	11.3
8 years	15	12.9	19	13.5
9 years	18	15.5	29	20.6
10 years	20	17.2	22	15.6
11 years	28	24.1	21	14.9
12 years	19	16.4	23	16.3
13 years	7	6.0	11	7.8
Home language				
Afrikaans	110	94.8	138	97.9
English	5	4.3	1	0.7
Southern Sotho	1	0.9	2	1.4

*School A = nutritionally-regulated tuck shop; **School B = conventional tuck shop

3.3 PRIMARY SCHOOL LEARNERS' PERCEPTIONS, ATTITUDES AND BEHAVIOUR TOWARDS HEALTHY EATING IN A SCHOOL WITH CONVENTIONAL TUCK SHOP AND IN A SCHOOL WITH A NUTRITIONALLY-REGULATED TUCK SHOP

One of the secondary objectives was to determine if primary school's perceptions, attitudes and behaviour towards healthy eating differ between a school with a conventional tuck shop and a school with a nutritionally-regulated tuck shop. Findings related to the specific perceptions, attitudes and behaviour that were investigated in the two schools are discussed next. In certain instances where quantitative and qualitative data was obtained about the same topic, the quantitative and qualitative results are discussed simultaneously.

3.3.1 Learners' perceptions towards healthy eating

The questionnaire and focus groups discussions investigated perceptions about breakfast, sweets, fat, healthy and unhealthy foods, as well as perceptions about the schools' tuck shops.

3.3.1.1 Learners' perceptions about breakfast

A significant difference ($p=0.03$) was found between the grade 3 groups when asked if children who eat breakfast are clever. More grade 3's in school B (91.7%, n=22) agreed with the statement compared to grade 3's in school A (65%, n=13) (Table 3.2).

Table 3.2: "Children who eat breakfast are clever" (n=257)

School	Grade	N	Yes (n)	%	No (n)	%	Do not know (n)	%	P
A*	All	116	86	74.1	9	7.8	21	18.1	0.16
B**	All	141	114	80.9	4	2.8	23	16.3	
A	Boys	44	33	75	3	6.8	8	18.2	0.08
B	Boys	56	46	82.1	0	0	10	17.9	
A	Girls	72	53	73.6	6	8.3	13	18	0.55
B	Girls	85	68	80	4	4.7	13	15.3	
A	2	10	9	90	0	0	1	10	0.64
B	2	19	18	94.7	0	0	1	5.3	
A	3	20	13	65	0	0	7	35	**0.03**[#]
B	3	24	22	91.7	0	0	2	8.3	
A	4	20	16	80	2	10	2	10	0.13
B	4	29	24	82.8	0	0	5	17.2	
A	5	22	15	68.2	3	13.6	4	18.2	0.62
B	5	19	15	78.9	1	5.3	3	15.8	
A	6	22	17	77.3	0	0	5	22.7	0.27
B	6	29	19	65.5	2	6.9	8	27.6	
A	7	22	16	72.7	4	18.2	2	9.1	0.27
B	7	21	16	76.2	1	4.8	4	19.1	
A	Boys	44	33	75	3	6.8	8	18.2	0.96
A	Girls	72	53	73.6	6	8.3	13	18.1	
B	Boys	56	46	82.1	0	0	10	17.7	0.12
B	Girls	85	68	80	4	4.7	13	15.3	
A	2	10	9	90	0	0	1	10	0.07
A	3	20	13	65	0	0	7	35	
A	4	20	16	80	2	10	2	10	
A	5	22	15	68.2	3	13.6	4	18.2	
A	6	22	17	77.3	0	0	5	22.7	
A	7	22	16	72.7	4	18.2	2	9.1	
B	2	19	18	94.7	0	0	1	5.3	0.25
B	3	24	22	91.7	0	0	2	8.3	
B	4	29	24	82.8	0	0	5	17.2	
B	5	19	15	78.9	3	15.8	1	5.3	
B	6	29	19	65.5	2	6.9	8	27.6	
B	7	21	16	76.2	1	4.8	4	19.1	

M-L Chi-Square statistics, [#]significant difference p<0.05; *School A = nutritionally-regulated tuck shop; **School B = conventional tuck shop

3.3.1.2 Learners' perceptions about sweets

In both schools the majority of learners (88.8% in school A, n=103; 85.8% in school B, n=121) agreed with the statement "Sweet things can make children fat" while only 6.9% (n=8) of learners in school A and 6.5% (n=9) in school B did not agree. A significant difference was found between the grade 7 learners (p=0.04). In school A 86.4% (n=19) of grade 7 learners agreed with the statement, while 71.4% (n=15) in school B agreed. None of the grade 7 learners in school A indicated that they "did not know" if the statement was true, compared to 19.1% (n=4) in school B (Table 3.3). During the focus group discussions, both of the grade

7 groups agreed that they may have sweets, but not too much because it was unhealthy (Appendix K).

Table 3.3: "Sweet things can make children fat" (n=257)

School	Grade	N	Yes (n)	%	No (n)	%	Do not know (n)	%	P
A*	All	116	103	88.8	8	6.9	5	4.3	0.5
B**	All	141	121	85.8	9	6.4	11	7.8	
A	Boys	44	42	95.5	1	2.3	1	2.3	0.1
B	Boys	56	46	82.1	5	8.9	5	8.9	
A	Girls	72	61	84.7	7	9.7	4	5.6	0.45
B	Girls	85	75	88.2	4	4.7	6	7	
A	2	10	7	70	2	20	1	10	0.3
B	2	19	16	84	3	15.8	0	0	
A	3	20	19	95	0	0	1	5	0.48
B	3	24	21	87.5	1	4.2	2	8.3	
A	4	20	17	85	2	10	1	5	0.56
B	4	29	23	79.3	2	6.9	4	13.8	
A	5	22	20	90.9	1	4.6	1	4.6	0.53
B	5	19	18	94.7	0	0	1	5.3	
A	6	22	21	95.5	0	0	1	4.6	0.25
B	6	29	28	96.6	1	3.5	0	0	
A	7	22	19	86.4	3	13.6	0	0	**0.04**[#]
B	7	21	15	71.4	2	9.5	4	19.1	
A	Boys	44	42	95.5	1	2.3	1	2.3	0.16
A	Girls	72	61	84.7	7	9.7	4	5.6	
B	Boys	56	46	82.1	5	8.9	5	8.9	0.54
B	Girls	85	75	88.2	4	4.7	6	7.1	
A	2	10	7	70	2	20	1	10	0.3
A	3	20	19	95	0	0	1	5	
A	4	20	17	85	2	10	1	5	
A	5	22	20	90.9	1	4.6	1	4.6	
A	6	22	21	95.5	0	0	1	4.6	
A	7	22	19	86.4	3	13.6	0	0	
B	2	19	16	84.2	3	15.8	0	0	0.06
B	3	24	21	87.5	1	4.2	2	8.3	
B	4	29	23	79.3	2	6.9	4	13.8	
B	5	19	18	94.7	0	0	1	5.3	
B	6	29	28	96.6	1	3.5	0	0	
B	7	21	15	71.4	2	9.5	4	19.1	

ML Chi Square statistics [#]significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

A significant difference (p=0.03) was found between girls in the two schools when another perception about sweets was evaluated. More girls in school B 92.9% (n=79) agreed with the statement, "Children must first eat healthy food before they can eat sweets", compared to school A 88.9% (n=64). In school A, 27% (n=6) of grade 7's agreed with the statement while the entire grade 7 group (100%, n=21) in school B disagreed. It is interesting to note that all

(100%) of the grade 2 and 3 learners in both schools (n=10 in school A, n=19 in school B), as well as the grade 5 learners (n=21) in school A agreed with the statement. When comparing the grade 2 to 7 groups in school A, a significant difference (p=0.03) was found, since less grade 7's (72.7%, n=16) agreed with the statement compared to the other age groups (Table 3.6). During the focus group discussions learners from both schools, as well as different year and gender groups, were aware of the negative health impacts of consuming too much sugar and that intake should be controlled and limited ("makes you fat", "teeth will rot", "can only have sweets with a small amount of sugar in", "you will get sugar disease", "makes you nauseas and sick", "get addicted and then you want it every day", "gives one too much energy and that makes our parents crazy"), but despite these views sweets were still very popular among all the learners in both schools (Appendix K).

Table 3.4: "Children must first eat healthy food before they can eat sweets" (n=257)

School	Grade	N	Yes (n)	%	No (n)	%	Do not know (n)	%	P
A*	All	116	102	88.7	6	5.2	7	6	0.21
B**	All	141	130	92.1	2	1.4	9	6.4	
A	Boys	44	38	88.4	2	4.7	3	6.9	0.9
B	Boys	56	51	91	2	3.6	3	5.4	
A	Girls	72	64	88.9	4	5.6	4	5.6	**0.03**[#]
B	Girls	85	79	92.9	0	0	6	7	
A	2	10	10	100	0	0	0	0	1
B	2	19	19	100	0	0	0	0	
A	3	20	20	100	0	0	0	0	1
B	3	24	24	100	0	0	0	0	
A	4	20	16	80	1	5	3	15	0.54
B	4	26	26	89.7	1	3.5	2	6.9	
A	5	22	21	100	0	0	0	0	0.81
B	5	19	18	94.7	0	0	1	5.3	
A	6	22	19	86.4	1	4.6	2	9.1	0.45
B	6	29	24	82.8	0	0	5	17.2	
A	7	22	16	72.7	4	18.1	2	9.1	0.06
B	7	21	19	90.5	1	4.8	1	4.8	
A	Boys	44	38	88.4	2	4.7	3	6.9	0.94
A	Girls	72	64	88.9	4	5.6	4	5.6	
B	Boys	56	51	91.1	2	3.6	3	5.4	0.14
B	Girls	85	79	92.9	0	0	6	7.1	
A	2	10	10	100	0	0	0	0	**0.03**[#]
A	3	20	20	100	0	0	0	0	
A	4	20	16	80	1	5	3	15	
A	5	22	21	100	0	0	0	0	
A	6	22	19	86.4	1	4.6	2	9.1	
A	7	22	16	72.7	4	18.1	2	9.1	
B	2	19	19	100	0	0	0	0	0.17
B	3	24	24	100	0	0	0	0	
B	4	29	26	89.7	1	3.5	2	6.9	
B	5	19	18	94.7	0	0	1	5.3	
B	6	29	24	82.8	0	0	5	17.2	
B	7	21	19	90.5	1	4.8	1	4.8	

ML Chi Square statistics [#]significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

3.3.1.3 Learner's perceptions about fat

In school A15.5% (n=18) of learners and in school B 13.5% (n=19) of learners did not know whether fatty food is healthy or not. A significant difference (p=0.01) was found between the learners in school B, since learners in grade 2 (15.7%, n=3) and 3 (16.7%, n=4) disagreed with the statement and grade 4 (20.7%, n=6) and 6 (27.6%, n=8) learners indicated that they "did not know" compared to most of the learners in grades 5 (94.7%, n=18) and 7 (90.5%, n=19) who agreed with the statement (Table 3.5). During the focus group discussions most learners perceived fatty foods as unhealthy ("fat is not healthy because it comes from

animals", "fat makes you fat",), but in both schools a few learners (grade 2 to 5 in both schools) held views that was in contrast to the general views of others indicating that some learners do not perceive fat as unhealthy (grade 2, school B: "I like fat", "fat will not make you fat because it is nice"; grade 3, school A: "oily foods make you feel good on the inside"; grade 3, school B: "oily foods are very nice"; grade 4, school A: "oily foods...makes your hands and clothes dirty", grade 5, school A: "(fat is) nice to eat", grade 5, school B: "eating oily food is part of being a child"(Appendix K).

Table 3.5: "Fatty food is not healthy for children" (n=257)

School	Grade	N	Yes (n)	%	No (n)	%	Do not know (n)	%	P
A*	All	116	86	74.1	12	10.3	18	15.5	0.55
B**	All	141	112	79.4	10	7	19	13.5	
A	Boys	44	30	68.2	7	15.9	7	15.9	0.2
B	Boys	56	41	73.2	3	5.4	12	21.4	
A	Girls	72	56	77.8	5	6.9	11	15.3	0.38
B	Girls	85	71	83.5	7	8.2	7	8.2	
A	2	10	6	60	3	30	1	10	0.2
B	2	19	16	84.2	3	15.8	0	0	
A	3	20	17	85	1	5	2	10	0.45
B	3	24	18	75	4	16.7	2	8.3	
A	4	20	16	80	1	5	3	15	0.86
B	4	29	22	78.9	1	3.5	6	20.7	
A	5	22	16	72.7	2	9.1	4	18.2	0.10
B	5	19	18	94.7	0	0	1	5.3	
A	6	22	16	72.7	1	4.6	5	22.7	0.85
B	6	29	19	65.5	2	6.9	8	27.6	
A	7	22	15	68.2	4	18.2	3	13.6	0.05
B	7	21	19	90.5	0	0	2	9.5	
A	Boys	44	30	68.2	7	15.9	7	15.9	0.3
A	Girls	72	56	77.8	5	6.9	11	15.3	
B	Boys	56	41	73.21	3	5.4	12	21.4	0.8
B	Girls	85	71	83.5	7	8.2	7	8.24	
A	2	10	6	60	3	30	1	10	
A	3	20	17	85	1	5	2	10	
A	4	20	16	80	1	5	3	15	0.62
A	5	22	16	72.7	2	9.1	4	18.2	
A	6	22	16	72.7	1	4.6	5	22.7	
A	7	22	15	68.2	4	18.2	3	13.6	
B	2	19	16	84.2	3	15.8	0	0	
B	3	24	18	75	4	16.7	2	8.3	
B	4	29	22	78.9	1	3.5	6	20.7	**0.01**[#]
B	5	19	18	94.7	0	0	1	5.3	
B	6	29	19	65.5	2	6.9	8	27.6	
B	7	21	19	90.5	0	0	2	9.5	

ML Chi Square statistics [#]significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

When learners were evaluated on a perception about eating small amounts of fatty foods less than half of the learners in school A (48.3%, n=56) and just more than half of learners in school B (55.3%, n=78) agreed with the statement while the remaining learners disagreed or indicated that they "did not know". A significant difference (p=0.0005) was found between the grade 2 to 7 learners in school B since more than 50% of learners in each of the grade 2 to 5 groups agreed with the statement while only 27.6% (n=8) learners in grade 6 and 38.1% (n=8) in grade 7 agreed with the statement (Table 3.6). In the focus group discussions the same question was asked and the grade 2 to 4 groups misunderstood the question and could not always make the connection between oily hands and foods that are high in fat. It is interesting to note that the grade 5 to 7 groups agreed that fats may be eaten in small quantities and showed the most insight (Appendix K), although this trend is not seen in Table 3.6. Some of the older learners' views on fat include:

- School A, grade 6: "some types of fat are good for you"
- School A, grade 7: "It is not good for you", "One cannot eat fatty foods every day"
- School B, grade 6: "Oil is not good", "It contains fat"
- School B, grade 7: "fat stores up in your body...then you get cholesterol"

Table 3.6: "I must only eat a little bit of tuck shop foods that make my hands oily like pies and chips" (n=257)

School	Grade	N	Yes (n)	%	No (n)	%	Do not know (n)	%	P
A*	All	116	56	48.3	30	25.9	30	25.9	0.48
B**	All	141	78	55.3	29	20.6	34	24.1	
A	Boys	44	21	47.7	16	36.4	7	15.9	0.39
B	Boys	56	25	44.6	16	28.6	15	26.8	
A	Girls	72	35	48.6	14	19.4	23	31.9	0.22
B	Girls	85	53	62.4	13	15.3	19	22.4	
A	2	10	8	80	0	0	2	20	0.49
B	2	19	17	89.5	0	0	2	10.5	
A	3	20	12	60	5	25	3	15	0.54
B	3	24	16	66.7	3	12.5	5	20.8	
A	4	20	9	45	4	20	7	35	0.11
B	4	29	19	65.5	7	24.1	3	10.3	
A	5	22	11	50	5	22.7	6	27.3	0.89
B	5	19	10	52.6	5	26.3	4	21.1	
A	6	22	9	40.9	5	22.7	8	36.4	0.53
B	6	29	8	27.6	10	34.5	11	37.9	
A	7	22	7	31.8	11	50	4	18.2	0.07
B	7	21	8	38.1	4	19.1	9	42.86	
A	Boys	44	21	47.7	16	36.4	7	15.9	0.054
A	Girls	72	35	48.6	14	19.4	23	31.9	
B	Boys	56	25	44.6	16	28.6	15	26.8	0.08
B	Girls	85	53	62.4	13	15.3	19	22.4	
A	2	10	8	80	0	0	2	20	0.08
A	3	20	12	60	5	25	3	15	
A	4	20	9	45	4	20	7	35	
A	5	22	11	50	5	22.7	6	27.3	
A	6	22	9	40.9	5	22.7	8	36.4	
A	7	22	7	31.8	11	50	4	18.2	
B	2	19	17	89.5	0	0	2	10.5	**0.0005#**
B	3	24	16	66.7	3	12.5	5	20.8	
B	4	29	19	65.5	7	24.1	3	10.3	
B	5	19	10	52.6	5	26.3	4	21.1	
B	6	29	8	27.6	10	34.5	11	37.9	
B	7	21	8	38.1	4	19.1	9	42.86	

ML Chi Square statistics #significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

3.3.1.4 Learners' perception about selected foods

Learners' perceptions towards healthy eating were tested during the focus groups discussions by taking part in an activity. They grouped together the pictures which depict healthy or unhealthy foods according to their own perceptions (Table 3.7).

Table 3.7: Summary of grade 2 to 7 learners' perceptions of healthy and unhealthy food (n=72).

	School A*						School B**					
	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade7	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade7
Apples	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
White bread and rolls	✓	✓	X	X	X	X	✓	✓	✓	NS	✓	X
Potato crisps	X	✓	X	X	X	X	X	X	X	X	X	X
Sweets	X	X	X	X	X	X	X	X	X	X	X	X
Fruit salad	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Yoghurt	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Brown bread	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Carbonated cool drink	X	X	X	X	X	X	X	X	X	X	X	X
Pies	X	✓	X	X	X	X	NS	X	X	X	X	X
Dried fruit &raisins	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Milk	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Peanuts, peanut butter	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	NS	✓
Polony	NS	X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tomatoes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Biscuits	X	X	X	X	X	X	X	X	X	X	X	X
Potato chips	X	✓	X	X	X	X	X	X	X	X	X	X

✓=Healthy; X=Unhealthy; NS= Not Sure; *School A = nutritionally-regulated tuck shop; ** School B = conventional tuck shop

When comparing the groups in the two schools, the four groups with older learners (grade 4 to 7) in school A perceived white bread as unhealthy while only grade 7's in school B perceived white bread as unhealthy. Polony (processed meat) was perceived as healthy by all groups in school B, while grade 3's school A perceived polony as unhealthy and grade 2's in the same school were unsure. All groups in school A perceived peanut butter as healthy, while grade 5's in school B perceived peanut butter as unhealthy and grade 6's were unsure.

3.3.1.5 Learners' perceptions about the type of food tuck shops should sell

In the focus group discussions, three questions were asked with the purpose of eliciting the learners' perceptions towards their schools' tuck shops and also towards healthy eating in general. In this section the responses to these questions are discussed.

When learners were asked if other schools should have the same type of tuck shop as theirs, the younger learners in school A were more positive towards the extension of their type of tuck shop to other schools. There were some perceptions that items in the other schools' tuck shops were "too sweet", "they can learn to eat healthy"', they sell "unhealthy coke" ("with 12 spoons of sugar in it"). One said: "If you are used to eating healthy, your body takes time to adjust to eating unhealthy".

Interesting perceptions (mostly held by older learners) were that there is "no need" for other schools to also have a healthy tuck shop:

- Too expensive (grade 3)
- The tuck shop is too health conscious (grade 5).
- One eats enough healthy food at home (grade 5).
- Other children mock us (grade 6).
- Don't want to put them through it (grade 7).

Contradictory to the above, the learners at school B did not show very strong feelings regarding the question. Some expressed views that they prefer their tuck shop to be different from others, like school A's, "then we can buy fruit and fruit juice there". The "healthy" tuck shop at school A was brought into some of the discussions, resulting in interesting perceptions such as that school A's tuck shop is "awesome" and "a healthy tuck shop is good, but the children there probably do not like it" (Table 3.8).

Table 3.8: Responses of grade 2 to 7 learners to the question "Do you think other schools should have the same type of tuck shop as yours?" (n=72)

Grade	School A*	School B**
2	Yes, "sometimes they eat too many sweet stuff"	No, "otherwise they won't buy from our tuck shop", "our tuck shop is just right", one feels that it is expensive and another wants a tuck shop like school A because that is "awesome"
3	Yes, "ours is nice with fruit", "they can also be healthy", "they can learn to be healthy" No, "too expensive"	No, because they want to be different from other schools
4	No, because they want to be unique and they do not want others to be as healthy as they are "other children don't have the same taste that we have"	Yes, they want other children to have the same "pleasure" and to be able to "get what they want"
5	No, because it is too health conscious "we eat enough healthy food at home"	Yes, others should have the same "privilege"
6	Mixed feelings. "if your body if used to eating healthy food, it takes time to adjust to eat unhealthy", "children in this school aren't overweight", "other children mock us"	Yes, "they sell nice stuff". One girl thinks the tuck shop sells healthy food and fruit so other schools must have the same.
7	No, "don't want to put them through it"	No, because they would like to buy other things from other tuck shops. They mentioned that school A has a healthy tuck shop, "I think that is good, but the children probably do not like it"

*School A = nutritionally-regulated tuck shop; ** School B = conventional tuck shop

Learners were also asked what they thought other schools' learners think of their tuck shop. The majority of the learners at school A held perceptions that learners from other schools are negative towards their nutritionally-regulated tuck shop and perceived it as "too healthy" and also "they don't like it at all", "they feel sorry for us", "people think we try to get attention by having a healthy tuck shop". Learners in grades 2, 3 and 4 (the younger age groups) were again somewhat more positive with comments like: "My brother says we are lucky because our school sells nice fruit and vegetables and all those nice healthy things with a little bit of sweets, and their's almost only sells sweets".

At school B no strong feelings were again expressed. In general the learners perceived that others like their tuck shop, think it is "cool", but "just a bit expensive" (Table 3.9).

Table 3.9: Responses of grade 2 to 7 learners to the question, "What do children of other schools think of your tuck shop?" (n=72)

Grade	School A*	School B**
2	"it sucks", "the tuck shop is too healthy, "they do not like it"	Mixed feelings, others do not like it because "our tuck shop does not sell nice things"
3	"not nice…..only sells fruit", "not tasty", "My brother says we are lucky because our school sells nice fruit and vegetables and all those nice healthy things with a little bit of sweets, and their's almost only sells sweets"	No strong feelings
4	They think our tuck shop is "healthier"	They like it
5	"not a nice tuck shop"	"nice", "cool"
6	"stupid because it is healthy", "there is no sport drinks", they think "we are trying to get attention by having a healthy tuck shop"	They like it
7	"Don't like it at all", "they feel sorry for us"	They like it, just expensive

*School A = nutritionally-regulated tuck shop; ** School B = conventional tuck shop

Learners were asked to discuss whether tuck shops should sell only healthy foods or only sweets and unhealthy items. In most of the groups at school A the stronger feeling was that tuck shops should sell both healthy and unhealthy food for "a balance", because "some children want to buy sandwiches and some want to buy sweets" and "one cannot always eat healthy food". There were, however, also feelings for only either healthy or unhealthy. A learner in grade 5 asked for only sweets and carbonated cool drink because "this is what a tuck shop is supposed to sell". Similarly, a grade 7 learner remarked that some bought healthy food at the shop, but she brought healthy food to school in her lunchbox because "for me a tuck shop is sweets". A boy in grade 2 felt that they should only sell healthy food: "If you eat too many sweets you do not feel well" (he was immediately accused of "being on a diet"). The grade 6 group insisted on a combination of fruit, healthy food and sweets. They also showed more informed views with remarks such as "some fats are good for you; it will not make you fat" and "fruit and sweets will give you energy when you take part in sports".

At school B, most groups agreed that the school should sell healthy and unhealthy food items. It is interesting to note that some of the learners were aware that there was not much healthy food in their tuck shop. A stronger feeling towards "only healthy food" was detected

in grades 2 and 3 groups, with reasons being weight loss and that healthy food is "better for your stomach". Opinions, probably linked to habits strengthened at home, included: "you must first eat your food and afterwards you may get something sweet to eat" and "you cannot eat sweets all the time". There were also requests for "more fruits more times per week" and "they should sell healthy with little bit less sweets" (Table 3.10).

Table 3.10: Responses of grade 2 to 7 learners to the question, "Do you think tuck shops should only sell healthy food or only sweets?" (n=72)

Grade	School A* (n=36)	School B** (n=36)
2	Strong feeling that tuck shop should sell a combination of healthy and unhealthy. "then one can buy carbonated cool drink", "then we don't only have to buy vegetables", "want something sweet", one boy wanted only healthy foods because "if you eat too many sweets you don't feel well", "the sweeter the fatter, the healthier, the thinner" – he was accused of being on a "diet".	Most want only healthy food, two want a combination and one wants only sweets. "Healthy food is good for your tummy", "I want to try to eat less sweets"
3	Strong feeling that both should be available, although one wants only chocolate and junk food.	Children are aware that healthy food is not being sold, Most wants a combination of healthy and unhealthy, while two wanted only healthy food because they "don't want to become fat"
4	Most want a combination, one wants only unhealthy foods on Fridays and another wants only healthy "it is actually better if it is healthy, otherwise it makes you fat"	Both, "you must first eat your food and afterwards you may get something sweet to eat", "not too sweet…not too healthy"
5	Majority wants a combination because "it is big enough to sell both" and "some children want to buy sandwiches and some want to buy sweets" One only wanted sweets and carbonated cool drinks because "a tuck shop must actually sell those types of things"	Both, "sometimes it is nice to get something sweet and other times it is nicer to stay healthy", "they should sell healthy with a bit less sweets", "more fruit, more times per week"
6	A combination of fruit, healthy food and sweets. "some fats are also healthy and they won't make you fat", "fruit and sweets will also give you energy for sport"	Both, "can't just always eat sweets"
7	Strong feeling that a combination should be available in order to have a "balance", "can't just always eat healthy, and so that "those who want to eat healthy can do it", "for me a tuck shop is about sweets, not healthy food"	Mixed feelings, "you're not just going to buy fruit, you buy that at *Fruit and Veg*", "People like different stuff"

*School A = nutritionally-regulated tuck shop; ** School B = conventional tuck shop

3.3.2 Learners' attitudes towards healthy eating

In this section the learners' attitudes towards the school's tuck shop, vegetables, fruit and milk are discussed.

3.3.2.1 Learners' attitudes towards the schools' tuck shops

There was a significant difference (p=0.007) between the responses of the grade 4's regarding their attitude towards a tuck shop that does not sell sweets and cool drinks. The majority of grade 4 learners in school B (79.3%, n=23) disagreed with the statement, while 35% (n=7) of the learners in grade 4 in school A disagreed and 40% (n=8) was unsure. A quarter (n=5) of grade 4's in school A agreed with the statement in comparison with 6.9% (n=2) in school B that agreed. Although only 12.5% (n=7) and 12.9% (n=11) of boys and girls in school B, respectively agreed with the statement a significant difference (p=0.04) was found between the genders for this school since 80.4% (n=45) of boys did not agree with the statement while (64.7%, n=55) girls in school B disagreed and 22.4% (n=19) were unsure. In school A a significant difference (p=0.000) was found between the grades, 60% (n=12) of grade 3 learners agreed with the statement while only 30% (n=3) in grade 2, 25% (n=5) in grade 4, and 4.6% (n=1) in grade 5 and 6 and none of the grade 7 learners agreed with the statement. The same trend was found in school B (p=0.0004) with 36.8% (n= 7) of learners in grade 2 and 33.3% (n=8) of learners in grade 3 that agreed with the statement in contrast to 6.9% (n=2) in grade 4, 4.8% (n=1) in grade 7 and none in grades 5 and 6 who agreed (Table 3.11).

Table 3.11: "The tuck shop must not sell sweets and cool drinks" (n=257)

School	Grade	N	Yes (n)	%	No (n)	%	Do not know (n)	%	P
A*	All	116	22	18.9	68	58.6	26	22.4	0.11
B**	All	141	18	12.8	100	70.9	23	16.31	
A	Boys	44	10	22.7	26	59	8	18	0.06
B	Boys	56	7	12.5	45	80.4	4	7.1	
A	Girls	72	12	16.7	42	58.3	18	25	0.69
B	Girls	85	11	12.9	55	64.1	19	22.4	
A	2	10	3	30	4	40	3	30	0.43
B	2	19	7	36.8	10	52.6	2	10.5	
A	3	20	12	60	7	35	1	5	0.2
B	3	24	8	33.3	13	54.2	3	12.5	
A	4	20	5	25	7	35	8	40	**0.007**[#]
B	4	29	2	6.9	23	79.3	4	13.8	
A	5	22	1	4.6	17	77.3	4	18.2	0.39
B	5	19	0	0	17	89.5	2	10.5	
A	6	22	1	4.6	14	63.6	7	31.8	0.26
B	6	29	0	0	23	79.31	6	20.7	
A	7	22	0	0	19	86.4	3	13.6	0.21
B	7	21	1	4.8	14	66.7	6	28.6	
A	Boys	44	10	22.7	26	59.1	8	18.8	0.57
A	Girls	72	12	16.7	42	58.3	18	25	
B	Boys	56	7	12.5	45	80.4	4	7.1	**0.04**[#]
B	Girls	85	11	12.9	55	64.7	19	22.4	
A	2	10	3	30	4	40	3	30	
A	3	20	12	60	7	35	1	5	
A	4	20	5	25	7	35	8	40	**0.000**[#]
A	5	22	1	4.6	17	77.3	4	18.2	
A	6	22	1	4.6	14	63.6	7	31.8	
A	7	22	0	0	19	86.4	3	13.6	
B	2	19	7	36.8	10	52.6	2	10.5	
B	3	24	8	33.3	13	54.2	3	12.5	
B	4	29	2	6.9	23	79.3	4	13.8	**0.0004**[#]
B	5	19	0	0	17	89.5	2	10.5	
B	6	29	0	0	23	79.31	6	20.7	
B	7	21	1	4.8	14	66.7	6	28.6	

ML Chi Square statistics [#]significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

During the focus group discussion the learners were asked if they liked their school's tuck shop. Mixed feelings were detected in school A regarding the nutritionally-regulated tuck shop, with the younger learners (grade 2 in particular) more positive than the older learners. Several like it "a little bit" or "not a lot" and the groups gave several opinions to state why they did or did not like the tuck shop. They were all aware that healthy food items were sold. The reasons for the positive attitude ("liking it") were based on perceptions that "it sells healthy good stuff"; the food is "tasty and nice", the venue is appealing ("lots of space"), and the shop sells "lekker goed" (nice stuff) - "like those pancakes". There were also

conversations (grades 4 and 5) about the "old" conventional tuck shop; some wanted it back and some wanted both. Some perceptions underlying negative attitudes towards the nutritionally-regulated tuck shop include feelings like "too expensive", “the food not nice and tasty”, “fruit not always fresh” (girls in grade 6).

In contrast to school A the learners in school B were in general very positive about their conventional tuck shop and the question did not trigger them to elaborate and voice their opinions as seen in the case of the focus groups in school A. They liked the tuck shop because they "like the food" and "the people are friendly". In the younger groups (grade 2 and 3) some learners were conscious of the fact that the food was not always healthy ("they sell things we should not eat"), while the older learners (grade 6 and 7) mentioned that they did not like the prices (“expensive”) (Table 3.12).

Table 3.12: Responses of grade 2 to 7 learners in a school with a nutritionally-regulated tuck shop and a school with a conventional tuck shop to the question, “Do you like your tuck shop?” (n=72)

Grade	School A* (n=36)	School B** (n=36)
2	All the children like it “It sells good stuff”, “It sells healthy”	Most children like it. One claims there is not enough variety and one feels that “they sell things we may not eat”
3	Mixed feeling, unenthusiastic, it is “expensive”	Most like it, except one because “it is unhealthy”
4	Mixed feelings, some like the current tuck shop while others long for the old tuck shop, but not all agree “No, there was only sweets”, a girl suggest that healthy food should be sold in afternoons and during the short break and during the long break only sweets should be sold.	Yes, they all like it
5	They do not like it, one likes it a bit, “it only sells healthy food, not sweets”, “a tuck shop must sell sweets”, “too health conscious”, “the previous tuck shop was much nicer”	Yes, they like the food and the people are friendly
6	Not enthusiastic about the tuck shop, boys like it “”tasty and nice”, “nice and healthy”, “lots of space”,girls dislike it “ food not tasty”, “fruit not fresh”, “expensive”	Yes, but it is expensive
7	Most do not like it “I guess we are just not use to it”, “they do have nice stuff there, like those pancakes”	Yes, but it is expensive

*School A = nutritionally-regulated tuck shop; ** School B = conventional tuck shop

3.3.2.2 Learners' attitudes towards vegetables

In both schools a quarter of the learners dislike the taste of vegetables (24.1% in school A, n=28; 25.2% in school B, n=37). A significant difference (p=0.03) was found between the grades in school B, 83.3% (n=20) of grade 3's liked the taste of vegetables while in all the other groups (grade 2, 4 to 7) 50% or less indicated that they agreed with the statement (Table 3.13). During the focus group discussions there were mixed feelings about vegetables (all grades) and some strange perceptions (in particular among younger learners) (Appendix K).

Table 3.13: "I like the taste of vegetables" (n=257)

School	Grade	N	Yes (n)	%	No (n)	%	Do not know (n)	%	P
A*	All	116	67	57.8	28	24.1	21	18.1	0.83
B**	All	141	76	53.9	37	25.2	28	19.9	
A	Boys	44	26	59	9	20.5	9	20.45	0.76
B	Boys	56	30	53.6	15	26.8	11	19.6	
A	Girls	72	41	56.9	19	26.4	12	16.7	0.86
B	Girls	85	46	54.1	22	25.9	17	20	
A	2	10	7	70	2	20	1	10	0.39
B	2	19	10	52.6	3	15.8	6	31.6	
A	3	20	14	70	3	15	3	15	0.58
B	3	24	20	83.3	2	8.3	2	8.3	
A	4	20	12	60	6	30	2	10	0.59
B	4	29	15	51.7	8	27.6	6	20.7	
A	5	22	12	54.6	7	31.8	3	13.6	0.59
B	5	19	9	47.4	5	26.3	5	26.3	
A	6	22	14	63.6	5	22.7	3	13.6	0.16
B	6	29	12	41.4	14	48.3	3	10.3	
A	7	22	8	36.4	5	22.7	9	40.9	0.67
B	7	21	10	47.6	5	23.8	6	28.6	
A	Boys	44	26	59.1	9	20.5	9	20.5	0.73
A	Girls	72	41	56.9	19	26.4	12	16.7	
B	Boys	56	30	53.6	15	26.8	11	19.6	0.9
B	Girls	85	46	54.1	22	25.9	17	20	
A	2	10	7	70	2	20	1	10	0.34
A	3	20	14	70	3	15	3	15	
A	4	20	12	60	6	30	2	10	
A	5	22	12	54.6	7	31.8	3	13.6	
A	6	22	14	63.6	5	22.7	3	13.6	
A	7	22	8	36.4	5	22.7	9	40.9	
B	2	19	10	52.6	3	15.8	6	31.6	**0.03#**
B	3	24	20	83.3	2	8.3	2	8.3	
B	4	29	15	51.7	8	27.6	6	20.7	
B	5	19	9	47.4	5	26.3	5	26.3	
B	6	29	12	41.4	14	48.3	3	10.3	
B	7	21	10	47.6	5	23.8	6	28.6	

ML Chi Square statistics #significant difference p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

To further evaluate the attitudes of learners towards vegetables the learners had to indicate the specific vegetables which they liked (see section D of questionnaire in Appendix B). Overall several significant differences ($p<0.05$) were found for some green vegetables (lettuce, cucumber, spinach, broccoli and peas) and other vegetables (sweet peppers, mushrooms carrots and cauliflower) in school A compared to school B. Significant differences between boys and girls in school B show that girls liked cucumber ($p=0.03$), green beans ($p=0.04$), tomatoes ($p=0.001$) and carrots ($p=0.03$) more than boys, while in school A significant differences between boys and girls show that girls liked potatoes ($p=0.048$) and sweet potatoes ($p=0.048$) more than boys. The significant differences between the age groups in school A indicate that grade 2 learners liked cucumber ($p= 0.004$), pumpkin ($p=0.02$) and sweet potato ($p=0.004$) the least compared to the other grades in school A. In school B significant differences between the age groups indicate that grade 2 learners liked spinach (0.005) and potato ($p=0.004$) the least, while grade 6 learners liked carrots ($p=0.02$) the least, the grade 2 and 6 groups like corn (0.02) the least and the grade 2, 3 and 6 groups liked sweet potato (0.042) the least compared to the other age groups in this school (Table 3.14-3.16).

Table 3.14: Green vegetables that grade 2 to 7 learners liked (n=257)

School	Grade	N	Lettuce (n)	%	P	Cucumber (n)	%	p	Spinach (n)	%	P	Cabbage (n)	%	p	Broccoli (n)	%	p	Green beans (n)	%	p	Peas (n)	%	P
A*	**All**	116	63	54.3	0.09	95	81.9	0.15	59	50.9	**0.009**[#]	42	36.2	0.14	60	51.7	**0.02**[#]	46	39.6	0.65	71	61.2	**0.02**[#]
B**	**All**	141	62	43.9		105	74.5		49	34.8		39	27.7		52	36.9		52	36.9		65	46.1	
A	**Boys**	44	26	59	**0.048**[#]	35	79.6	0.09	25	56.8	0.08	16	36.4	0.15	20	45.5	0.32	16	36.4	0.3	24	54.6	0.13
B	**Boys**	56	22	39.3		36	64.3		22	39.3		13	23.2		20	35.7		15	26.8		22	39.3	
A	**Girls**	72	37	51.4	0.59	60	83.3	0.72	34	47.2	**0.047**[#]	26	36.1	0.46	40	55.6	**0.02**[#]	30	41.7	0.81	47	65.3	0.06
B	**Girls**	85	40	47		69	81.2		27	31.8		26	30.6		32	37.7		37	43.5		43	50.6	
A	**2**	10	5	50	0.33	4	40	**0.04**[#]	4	40	0.07	3	30	0.83	4	40	0.65	2	20	0.95	4	40	0.65
B	**2**	19	6	31.8		15	78.9		2	10.5		5	26.3		6	31.8		4	21		6	31.6	
A	**3**	20	13	65	0.47	19	95	**0.01**[#]	13	65	0.32	11	55	0.38	12	60	0.51	7	35	0.21	14	70	0.6
B	**3**	24	13	54.2		16	66.7		12	50		10	41.7		12	50		13	54.2		15	62.5	
A	**4**	20	11	55	0.34	14	70	0.46	12	60	0.08	9	45	0.32	14	70	0.2	10	50	0.18	11	55	0.24
B	**4**	29	12	41.4		23	79.3		10	34.5		9	31		15	51.7		9	31		11	37.9	
A	**5**	22	10	45.5	0.58	17	77.3	0.29	7	31.8	0.7	7	31.8	0.7	11	50	0.61	8	36.4	0.75	14	63.6	0.08
B	**5**	19	7	36.8		17	89.5		5	26.3		5	26.3		8	42.1		6	31.6		7	36.8	
A	**6**	22	9	40.9	0.97	22	100	**0.00005**[#]	11	50	0.05	6	27.3	0.39	9	40.9	0.06	9	40.9	0.47	12	54.6	0.66
B	**6**	29	12	41.4		17	58.6		7	24.1		5	17.2		5	17.2		9	31		14	48.3	
A	**7**	22	15	68.2	0.45	19	86.4	0.63	12	54.6	0.62	6	27.3	0.79	10	45.5	0.25	10	45.5	0.65	16	72.7	0.28
B	**7**	21	12	57.1		17	80.9		13	61.9		5	23.8		6	28.6		11	52.4		12	57.1	
A	**Boys**	44	26	59.1	0.42	35	79.6	0.61	25	56.8	0.32	16	36.4	0.98	20	45.5	0.3	16	36.4	0.57	24	54.5	0.25
A	**Girls**	72	37	51.4		60	83.3		34	47.2		26	36.1		40	55.6		30	41.7		47	65.3	
B	**Boys**	56	22	39.3	0.4	36	64.3	**0.03**[#]	22	39.3	0.4	13	23.2	0.33	20	35.7	0.82	15	26.8	**0.04**[#]	22	39.3	0.19
B	**Girls**	85	40	47.1		69	81.2		27	31.8		26	30.6		32	37.7		37	43.5		43	50.6	
A	**2**	10	5	50		4	40		4	40		3	30		4	40		2	20		4	40	
A	**3**	20	13	65		19	95		13	65		11	55		12	60		7	35		14	70	
A	**4**	20	11	55	0.41	14	70	**0.0004**[#]	12	60	0.3	9	45	0.36	14	70	0.4	10	50	0.66	11	55	0.5
A	**5**	22	10	45.5		17	77.3		7	31.8		7	31.8		11	50		8	36.4		14	63.6	
A	**6**	22	9	40.9		22	100		11	50		6	27.3		9	40.9		9	40.9		12	54.6	
A	**7**	22	15	68.2		19	86.4		12	54.6		6	27.3		10	45.5		10	45.5		16	72.7	
B	**2**	19	6	31.8		15	78.9		2	10.5		5	26.3		6	31.8		4	21		6	31.6	
B	**3**	24	13	54.2		16	66.7		12	50		10	41.7		12	50		13	54.2		15	62.5	
B	**4**	29	12	41.4	0.51	23	79.3	0.16	10	34.5	**0.005**[#]	9	31	0.51	15	51.7	0.05	9	31	0.14	11	37.9	0.23
B	**5**	19	7	36.8		17	89.5		5	26.3		5	26.3		8	42.1		6	31.6		7	36.8	
B	**6**	29	12	41.4		17	58.6		7	24.1		5	17.2		5	17.2		9	31		14	48.3	
B	**7**	21	12	57.1		17	80.9		13	61.9		5	23.8		6	28.6		11	52.4		12	57.1	

ML Chi Square statistics [#]significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

Table 3.15: Other vegetables that grade 2 to 7 learners liked (n=257)

School	Grade	N	Tomato (n)	%	P	Sweet pepper (n)	%	p	Pumpkin (n)	%	p	Mush-rooms (n)	%	P	Beetroot (n)	%	P	Carrot (n)	%	P	Cauli flower (n)	%	P
A*	**All**	116	69	59.5	0.37	25	21.6	0.17	62	53.5	0.85	57	49.1	**0.02***	59	50.9	0.09	99	85.3	**0.005***	45	38.8	0.07
B**	**All**	141	76	53.9		21	14.9		77	54.6		49	34.8		57	40.4		100	70.9		40	28.4	
A	**Boys**	44	24	54.6	0.09	12	27.3	0.4	20	45.5	0.65	23	52.3	0.06	22	50	0.07	36	81.8	**0.02***	18	40.9	**0.02***
B	**Boys**	56	21	37.5		11	19.6		28	50		19	33.9		18	32.1		34	60.7		11	19.6	
A	**Girls**	72	45	62.5	0.77	13	18	0.27	42	58.3	0.93	34	47.2	0.13	37	51.4	0.5	63	87.5	0.1	27	37.5	0.66
B	**Girls**	85	55	64.7		10	11.8		49	57.7		30	35.3		39	45.9		66	77.7		29	34.1	
A	**2**	10	4	40	0.87	1	10	0.64	2	20	0.22	4	40	0.65	3	30	0.93	6	60	0.65	3	30	0.6
B	**2**	19	7	36.8		1	5.3		8	42.1		6	31.6		6	31.6		13	68.4		4	21	
A	**3**	20	11	55	0.96	6	30	0.49	10	50	0.78	11	55	0.24	13	65	0.32	18	90	0.19	10	50	0.58
B	**3**	24	13	54.2		5	20.8		13	54.2		9	37.5		12	50		18	75		10	41.7	
A	**4**	20	15	75	0.06	6	30	0.65	11	55	0.46	12	60	0.13	12	60	0.2	18	90	0.07	9	45	0.32
B	**4**	29	14	48.3		7	24.1		19	65.5		11	37.9		12	41.4		20	68.9		9	31	
A	**5**	22	9	40.9	0.15	3	13.6	**0.04***	15	68.2	0.5	10	45.5	0.09	9	40.9	0.68	16	72.7	0.37	8	36.4	0.49
B	**5**	19	12	63.2		0	0		11	57.9		4	21.1		9	47.4		16	84.2		5	26.3	
A	**6**	22	13	59.1	0.83	1	4.6	0.25	8	36.4	0.91	8	36.4	0.34	11	50	0.1	21	95.5	**0.0001***	8	36.4	0.34
B	**6**	29	18	62.1		4	13.8		11	37.9		7	24.1		8	27.6		14	48.3		7	24.1	
A	**7**	22	17	77.3	0.16	8	36.4	0.2	16	72.7	0.92	12	54.6	0.86	11	50	0.88	20	90.9	0.96	7	31.8	0.56
B	**7**	21	12	57.1		4	19.1		15	71.4		12	57.1		10	47.6		19	90.5		5	23.8	
A	**Boys**	44	24	54.5	0.4	12	27.3	0.25	20	45.5	0.18	23	52.3	0.6	22	50	0.89	36	81.8	0.41	18	40.9	0.71
A	**Girls**	72	45	62.5		13	18.1		42	58.3		34	47.2		37	51.4		63	87.5		27	37.5	
B	**Boys**	56	21	37.5	**0.001***	11	19.4	0.2	28	50	0.4	19	33.9	0.9	18	32.1	0.1	34	60.7	**0.03***	11	19.6	0.06
B	**Girls**	85	55	64.7		10	11.8		49	57.7		30	35.3		39	45.9		66	77.7		29	34.1	
A	**2**	10	4	40	0.07	1	10	0.05	2	20	**0.02***	4	40	0.64	3	30	0.42	6	60	0.08	3	30	0.81
A	**3**	20	11	55		6	30		10	50		11	55		13	65		18	90		10	50	
A	**4**	20	15	75		6	30		11	55		12	60		12	60		18	90		9	45	
A	**5**	22	9	40.9		3	13.6		15	68.2		10	45.5		9	40.9		16	72.7		8	36.4	
A	**6**	22	13	59.1		1	4.6		8	36.4		8	36.4		11	50		21	95.5		8	36.4	
A	**7**	22	17	77.3		8	36.4		16	72.7		12	54.6		11	50		20	90.9		7	31.8	
B	**2**	19	7	36.8	0.53	1	5.3	0.06	8	42.1	0.13	6	31.6	0.16	6	31.6	0.49	13	68.4	**0.02***	4	21	0.69
B	**3**	24	13	54.2		5	20.8		13	54.2		9	37.5		12	50		18	75		10	41.7	
B	**4**	29	14	48.3		7	24.1		19	65.5		11	37.9		12	41.4		20	68.9		9	31	
B	**5**	19	12	63.2		0	0		11	57.9		7	24.1		9	47.4		16	84.2		5	26.3	
B	**6**	29	18	62.1		4	13.8		11	37.9		12	57.1		8	27.6		14	48.3		7	24.1	
B	**7**	21	12	57.1		4	19.1		15	71.4		6	31.6		10	47.6		19	90.5		5	23.8	

ML Chi Square statistics #significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

Table 3.16: Starchy vegetables that grade 2 to 7 learners liked (n=257)

School	Grade	N	Corn (n)	%	P	Sweet potato (n)	%	P	Potato (n)	%	P
A*	All	116	106	91.4	0.12	61	52.6	0.17	95	81.9	0.07
B**	All	141	120	85.1		62	43.9		102	72.3	
A	Boys	44	39	88.6	0.36	18	40.9	0.84	32	72.7	0.47
B	Boys	56	46	82.1		24	42.9		37	66	
A	Girls	72	67	93	0.2	43	59.7	0.06	63	87.5	0.07
B	Girls	85	74	87		38	44.7		65	76.5	
A	2	10	9	90	0.43	1	10	0.17	6	60	0.36
B	2	19	15	79		6	31.6		8	42.1	
A	3	20	17	85	0.49	11	55	0.15	17	85	0.26
B	3	24	22	91.7		8	33.3		17	70.8	
A	4	20	19	95	0.3	10	50	0.55	17	85	0.07
B	4	29	25	86.2		12	41.4		18	62	
A	5	22	21	95.5	0.46	10	45.5	0.43	16	72.7	0.17
B	5	19	17	89.5		11	57.9		17	89.5	
A	6	22	18	81.8	0.29	11	50	0.26	18	81.8	0.82
B	6	29	20	68.9		10	34.5		23	79.3	
A	7	22	22	100	0.86	18	81.8	0.42	21	95.5	0.52
B	7	21	21	100		15	71.4		19	90.5	
A	Boys	44	39	88.6	0.42	18	40.9	**0.048#**	32	72.7	**0.048#**
A	Girls	72	67	93		43	59.7		63	87.5	
B	Boys	56	46	82.1	0.42	24	42.9	0.83	37	66.1	0.18
B	Girls	85	74	87.1		38	44.7		65	76.5	
A	2	10	9	90	0.17	1	10	**0.004#**	6	60	0.18
A	3	20	17	85		11	55		17	85	
A	4	20	19	95		10	50		17	85	
A	5	22	21	95.5		10	45.5		16	72.7	
A	6	22	18	81.8		11	50		18	81.8	
A	7	22	22	100		18	81.8		21	95.5	
B	2	19	15	79	**0.02#**	6	31.6	**0.042#**	8	42.1	**0.004#**
B	3	24	22	91.7		8	33.3		17	70.8	
B	4	29	25	86.2		12	41.4		18	62	
B	5	19	17	89.5		11	57.9		17	89.5	
B	6	29	20	68.9		10	34.5		23	79.3	
B	7	21	21	100		15	71.4		19	90.5	

ML Chi Square statistics #significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

3.3.2.3 Learners' attitude towards fruit

Half of the learners from both schools indicated that they would rather buy fruit than sweets at the tuck shop (53.5% in school A, n=62; 49.7% in school B, n=70). A significant difference (p=0.04) between genders in school B show that more girls (52.9%, n=45) agreed with the statement compared to boys (44.6%, n=25). Significant differences between the age groups was found in school A (p=0.0002) and school B (p=0.000) indicating that 70% and more of the younger learners (grade 2 to 4 in school A and grade 2 to 3 in school B) agreed with the statement in contrast to older learners where about 50% agreed with the statement in grade

5 (50%, n=11) in school A and grade 4 in school B (55.2%, n=16) and about 30% and less of the older learners in both schools (grade 6 and 7 in school A and grade 5 to 7 in school B) agreed with the statement (Table 3.17).

Table 3.17: I will rather buy fresh fruit than sweets at the tuck shop (n=257)

School	Grade	N	Yes (n)	%	No (n)	%	Do not know (n)	%	P
A*	All	116	62	53.5	19	16.4	35	30.17	0.82
B**	All	141	70	49.7	26	18.4	45	31.9	
A	Boys	44	25	56.8	8	18.2	11	25	0.39
B	Boys	56	25	44.6	16	28.6	15	26.8	
A	Girls	72	37	51.4	11	15.3	24	33.3	0.81
B	Girls	85	45	52.9	10	11.8	30	35.3	
A	2	10	7	70	0	0	3	30	0.6
B	2	19	15	78.9	0	0	4	21	
A	3	20	18	90	0	0	2	10	0.28
B	3	24	20	83.3	2	8.3	2	8.3	
A	4	20	15	75	2	10	3	15	0.26
B	4	29	16	55.2	8	27.6	5	17.2	
A	5	22	11	50	6	27.3	5	22.7	0.05
B	5	19	6	31.6	2	10.5	11	57.9	
A	6	22	6	27.3	6	27.3	10	45.5	0.95
B	6	29	7	24.1	9	31	13	44.8	
A	7	22	5	22.7	5	22.7	12	54.6	0.88
B	7	21	6	28.6	5	23.8	10	47.6	
A	Boys	44	25	56.8	8	18.2	11	25	0.63
A	Girls	72	37	51.4	11	15.3	24	33.3	
B	Boys	56	25	44.6	16	28.6	15	26.8	**0.04**[#]
B	Girls	85	45	52.9	10	11.8	30	35.3	
A	2	10	7	70	0	0	3	30	**0.0002**[#]
A	3	20	18	90	0	0	2	10	
A	4	20	15	75	2	10	3	15	
A	5	22	11	50	6	27.3	5	22.7	
A	6	22	6	27.3	6	27.3	10	45.5	
A	7	22	5	22.7	5	22.7	12	54.6	
B	2	19	15	78.9	0	0	4	21	**0.000**[#]
B	3	24	20	83.3	2	8.3	2	8.3	
B	4	29	16	55.2	8	27.6	5	17.2	
B	5	19	6	31.6	2	10.5	11	57.9	
B	6	29	7	24.1	9	31	13	44.8	
B	7	21	6	28.6	5	23.8	10	47.6	

ML Chi Square statistics [#]significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

In order to further evaluate the attitudes of learners towards fruit they had to indicate the specific types of fruit they liked. Several significant differences (p<0.05) for vitamin C-rich fruits (nartjies, guava, watermelon, melon, mango) pear and fig were found when similar groups in the two schools were compared indicating that as a school the learners in school A, and some age groups in school A like these fruit significantly more when compared to the

same groups in school B. Significant differences between genders show that girls in school B like strawberries (p=0.04) and mango (p=0.01) more than boys in school B, while girls in school A like grapes (p=0.007) more than boys in this school. Significant differences between the age groups indicate that grade 2 learners in school A liked nartjies (p=0.04), watermelon (p=0.02), litchi (p=0.03) and peach (p=0.002) the least and grade 2 and 5 learners in this school liked pear (p=0.02) the least compared to other age groups in school A. The same trend was seen with the grade 2's in school B, significant differences show that grade 2's liked orange (p=0.006), nartjie (p=0.001), litchi (p=0.007), mango (p=0.003), peach (p=0.001) and apricot (p=0.0006) the least and grade 2 and 6 learners liked melon (p=0.003) the least compared to the other age groups in school B (Table 3.18(a), 3.18(b), 3.19(a) and 3.19(b)).

Table 3.18(a): Vitamin C-rich fruit that grade 2 to 7 learners liked (n=257)

School	Grade	N	Melon (n)	%	p	Mango (n)	%	P	Pine-apple (n)	%	p	Litchi (n)	%	P
A*	All	116	61	52.6	**0.001**#	76	65.5	0.19	87	75	0.069	94	81	0.17
B**	All	141	46	32.6		81	57.5		91	64.5		104	73.8	
A	Boys	44	19	43.2	0.34	27	61.4	0.1	30	68.2	0.34	32	72.7	0.6
B	Boys	56	19	33.9		25	44.6		33	58.9		38	67.9	
A	Girls	72	42	58.3	**0.0008**#	49	68	0.77	57	79.2	0.12	62	86.11	0.17
B	Girls	85	27	31.8		56	65.9		58	68.2		66	77.7	
A	2	10	3	30	0.2	6	60	**0.04**#	3	30	0.71	4	40	0.7
B	2	19	2	10.5		4	21		7	36.8		9	47.4	
A	3	20	11	55	0.24	11	55	0.96	16	80	0.69	16	80	0.2
B	3	24	9	37.5		13	54.2		18	74		15	62.5	
A	4	20	9	45	0.21	15	75	0.23	14	70	0.56	16	80	0.95
B	4	29	8	27.6		17	58.2		18	62		23	79.3	
A	5	22	10	45.6	0.65	13	59.1	0.17	19	86.4	0.16	18	81.8	0.19
B	5	19	10	52.6		15	78.9		13	68.4		18	94.7	
A	6	22	12	54.6	**0.005**#	15	68.2	0.15	16	72.7	0.42	19	86.4	0.08
B	6	29	5	17.2		14	48.3		18	62.1		19	65.5	
A	7	22	16	72.3	0.28	16	72.7	0.29	19	86.4	0.63	21	95.5	0.97
B	7	21	12	57.1		18	85.7		17	80.9		20	95.2	
A	Boys	44	19	43.2	0.11	27	61.4	0.46	30	68.2	0.19	32	72.7	0.78
A	Girls	72	42	58.3		49	68.1		57	79.2		62	86.11	
B	Boys	56	19	33.9	0.79	25	44.6	**0.01**#	33	58.9	0.26	38	67.9	0.2
B	Girls	85	27	31.8		56	65.9		58	68.2		66	77.7	
A	2	10	3	30	0.23	6	60	0.71	3	30	0.02	4	40	**0.03**#
A	3	20	11	55		11	55		16	80		16	80	
A	4	20	9	45		15	75		14	70		16	80	
A	5	22	10	45.6		13	59.1		19	86.4		18	81.8	
A	6	22	12	54.6		15	68.2		16	72.7		19	86.4	
A	7	22	16	72.3		16	72.7		19	86.4		21	95.5	
B	2	19	2	10.5	**0.003**#	4	21	**0.0003**#	7	36.8	0.07	9	47.4	**0.0007**#
B	3	24	9	37.5		13	54.2		18	74		15	62.5	
B	4	29	8	27.6		17	58.2		18	62		23	79.3	
B	5	19	10	52.6		15	78.9		13	68.4		18	94.7	
B	6	29	5	17.2		14	48.3		18	62.1		19	65.5	
B	7	21	12	57.1		18	85.7		17	80.9		20	95.2	

ML Chi Square statistics #significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

Table 3.18(b): Vitamin C-rich fruit that grade 2 to 7 learners liked (n=257)

School	Grade	N	Orange (n)	%	P	Nartjie (n)	%	P	Guava (n)	%	p	Straw-berry (n)	%	p	Water-melon (n)	%	P
A*	**All**	116	83	71.6	0.63	99	85.3	**0.02**[#]	50	43.1	**0.048**[#]	96	82.8	0.96	107	92.2	**0.03**[#]
B**	**All**	141	97	68.8		103	73		44	31.2		117	82.9		118	83.7	
A	**Boys**	44	33	75	0.13	36	81.8	0.07	18	40.9	0.06	33	75	0.1	38	86.4	0.42
B	**Boys**	56	34	60.7		37	66		13	23.2		42	75		45	80.4	
A	**Girls**	72	50	69.4	0.52	63	87.5	0.1	32	44.4	0.31	63	87.5	0.89	69	95.8	**0.03**[#]
B	**Girls**	85	63	74.1		66	77.7		31	36.5		75	88.2		73	85.9	
A	**2**	10	7	70	0.09	7	70	0.09	2	20	0.49	6	60	0.65	7	70	0.93
B	**2**	19	7	36.8		7	36.8		2	10.5		13	68.4		13	68.4	
A	**3**	20	15	75	0.54	17	85	0.62	9	45	0.43	18	90	0.52	17	85	0.81
B	**3**	24	16	66.7		19	79.2		8	33.3		20	83		21	87.5	
A	**4**	20	16	80	0.17	17	85	**0.04**[#]	9	45	0.21	19	95	0.06	18	90	0.69
B	**4**	29	18	62		17	58.6		8	27.6		22	75.9		25	86.2	
A	**5**	22	11	50	0.12	16	72.7	0.17	6	27.3	0.32	15	68.2	0.09	22	100	**0.03**[#]
B	**5**	19	14	73.7		17	87.5		8	42.1		17	89.5		16	84.2	
A	**6**	22	6	27.3	0.58	20	90.9	0.25	11	50	0.1	20	90.9	0.6	21	95.5	0.14
B	**6**	29	23	79.1		23	79.3		8	27.6		25	86.2		24	82.8	
A	**7**	22	18	81.8	0.41	22	100	0.08	13	59.1	0.45	18	81.8	0.16	22	100	0.08
B	**7**	21	19	90.5		20	95.2		10	47.6		20	95.2		19	90.5	
A	**Boys**	44	33	75	0.52	36	81.8	0.41	18	40.9	0.7	33	75	0.09	38	86.4	0.07
A	**Girls**	72	50	69.4		63	87.5		32	44.4		63	87.5		69	95.8	
B	**Boys**	56	34	60.7	0.94	37	66.1	0.13	13	23.2	0.09	42	75	**0.04**[#]	45	80.4	0.38
B	**Girls**	85	63	74.1		66	77.7		31	36..5		75	88.2		73	85.9	
A	**2**	10	7	70	0.25	7	70	**0.04**[#]	2	20	0.19	6	60	0.06	7	70	**0.02**[#]
A	**3**	20	15	75		17	85		9	45		18	90		17	85	
A	**4**	20	16	80		17	85		9	45		19	95		18	90	
A	**5**	22	11	50		16	72.7		6	27.3		15	68.2		22	100	
A	**6**	22	6	27.3		20	90.9		11	50		20	90.9		21	95.5	
A	**7**	22	18	81.8		22	100		13	59.1		18	81.8		22	100	
B	**2**	19	7	36.8	**0.006**[#]	7	36.8	**0.0001**[#]	2	10.5	0.13	13	68.4	0.2	13	68.4	0.56
B	**3**	24	16	66.7		19	79.2		8	33.3		20	83		21	87.5	
B	**4**	29	18	62		17	58.6		8	27.6		22	75.9		25	86.2	
B	**5**	19	14	73.7		17	87.5		8	42.1		17	89.5		16	84.2	
B	**6**	29	23	79.1		23	79.3		8	27.6		25	86.2		24	82.8	
B	**7**	21	19	90.5		20	95.2		10	47.6		20	95.2		19	90.5	

ML Chi Square statistics [#]significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

Table 3.19(a): Non-Vitamin C-rich fruit that grade 2 to 7 learners liked (n=257)

School	Grade	N	Peach (n)	%	P	Plum (n)	%	p	Apricot (n)	%	P	Grapes (n)	%	P
A*	All	116	78	67.2	0.3	68	58.6	0.15	61	52.6	0.81	100	86.2	0.94
B**	All	141	86	61		70	49.7		72	51		122	86.5	
A	Boys	44	25	56.8	0.75	23	52.3	0.35	19	43.2	0.5	33	75	0.11
B	Boys	56	30	53.6		24	42.9		28	50		49	87.5	
A	Girls	72	53	73.6	0.29	45	62.5	0.29	42	58.3	0.41	67	93	0.14
B	Girls	85	56	65.9		46	54.1		44	51.8		73	85.9	
A	2	10	3	30	0.37	4	40	0.45	1	10	0.67	8	80	0.7
B	2	19	3	15.8		5	26.3		3	15.8		14	73.7	
A	3	20	11	55	0.96	9	45	0.74	11	55	0.82	17	85	0.49
B	3	24	13	54		12	50		14	58.3		22	91.7	
A	4	20	15	75	0.48	13	65	0.65	10	50	0.4	18	90	0.19
B	4	29	19	62.5		17	58.6		11	37.9		22	75.9	
A	5	22	11	50	0.12	13	59.1	0.93	12	54.6	0.9	19	86.4	0.36
B	5	19	14	73.7		11	57.9		10	52.6		18	94.7	
A	6	22	19	86.4	0.08	14	63.6	0.11	12	54.6	0.77	17	77.3	0.23
B	6	29	19	65.5		12	41.4		17	58.6		26	89.7	
A	7	22	19	86.4	0.96	15	68.2	0.67	15	68.2	0.33	21	95.5	0.97
B	7	21	18	85.7		13	61.9		17	80.9		20	95.2	
A	Boys	44	25	56.8	0.06	23	52.3	0.28	19	43.2	0.11	33	75	**0.007**[#]
A	Girls	72	53	73.6		45	62.5		42	58.3		67	93.1	
B	Boys	56	30	53.6	0.14	24	42.9	0.2	28	50	0.84	49	87.5	0.78
B	Girls	85	56	65.9		46	54.1		44	51.8		73	85.9	
A	2	10	3	30		4	40		1	10		8	80	
A	3	20	11	55		9	45		11	55		17	85	
A	4	20	15	75	**0.002**[#]	13	65	0.5	10	50	0.06	18	90	0.56
A	5	22	11	50		13	59.1		12	54.6		19	86.4	
A	6	22	19	86.4		14	63.6		12	54.6		17	77.3	
A	7	22	20	90.9		15	68.2		15	68.2		21	95.5	
B	2	19	3	15.8		5	26.3		3	15.8		14	73.7	
B	3	24	13	54		12	50		14	58.3		22	91.7	
B	4	29	19	62.5	**0.0001**[#]	17	58.6	0.17	11	37.9	**0.0006**[#]	22	75.9	0.13
B	5	19	14	73.7		11	57.9		10	52.6		18	94.7	
B	6	29	19	65.5		12	41.4		17	58.6		26	89.7	
B	7	21	18	85.7		13	61.9		17	80.9		20	95.2	

ML Chi Square statistics [#]significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

Table 3.19(b): Non-Vitamin C-rich fruit that grade 2 to 7 learners liked (n=257)

School	Grade	N	Apple (n)	%	P	Pear (n)	%	P	Banana (n)	%	P	Fig (n)	%	P
A*	**All**	116	95	81.9	0.94	63	54.3	0.31	79	68.1	0.21	41	35.3	**0.005**[#]
B**	**All**	141	116	82.3		67	47.9		106	75.2		28	19.9	
A	**Boys**	44	36	81.8	0.54	21	47.7	0.9	28	63.6	0.22	14	31.8	0.34
B	**Boys**	56	43	76.8		26	46.4		42	75		13	23.2	
A	**Girls**	72	52	81.9	0.5	42	58.3	0.23	51	70.8	0.53	27	37.5	**0.005**[#]
B	**Girls**	85	73	85.9		41	48.8		64	75.3		15	17.7	
A	**2**	10	7	70	0.6	5	50	0.2	5	50	0.2	1	10	0.44
B	**2**	19	15	78.9		5	26.3		14	73.7		4	21	
A	**3**	20	17	85	0.81	13	65	0.86	15	75	0.37	9	45	0.09
B	**3**	24	21	87.5		15	62.5		15	62.5		5	20.8	
A	**4**	20	15	75	0.48	13	65	0.25	17	85	0.07	9	45	0.21
B	**4**	29	19	65.5		14	48.3		18	62		8	27.6	
A	**5**	22	19	86.4	0.76	5	22.7	**0.02**[#]	12	54.6	0.09	4	18.2	0.19
B	**5**	19	17	89.5		11	57.9		15	78.9		1	5.3	
A	**6**	22	17	77.3	0.41	12	54.6	0.35	14	63.6	0.06	8	36.4	0.05
B	**6**	29	25	86.2		12	41.4		25	86.2		4	13.8	
A	**7**	22	20	90.9	0.96	15	68.2	0.23	16	72.7	0.13	10	45.5	0.25
B	**7**	21	19	90.5		10	50		19	90.5		6	28.6	
A	**Boys**	44	36	81.8	0.96	21	47.7	0.27	28	63.4	0.42	14	31.8	0.53
A	**Girls**	72	59	81.9		42	58.3		51	70.8		27	37.5	
B	**Boys**	56	43	76.8	0.17	26	46.4	0.78	42	75	0.97	13	23.2	0.42
B	**Girls**	85	73	85.9		41	48.8		64	75.3		15	17.7	
A	**2**	10	7	70	0.6	5	50	**0.02**[#]	5	50	0.22	1	10	0.1
A	**3**	20	17	85		13	65		15	75		9	45	
A	**4**	20	15	75		13	65		17	85		9	45	
A	**5**	22	19	86.4		5	22.7		12	54.6		4	18.2	
A	**6**	22	17	77.3		12	54.6		14	63.6		8	36.4	
A	**7**	22	20	90.9		15	68.2		16	72.7		10	45.5	
B	**2**	19	15	78.9	0.19	5	26.3	0.21	14	73.7	0.08	4	21	0.3
B	**3**	24	21	87.5		15	62.5		15	62.5		5	20.8	
B	**4**	29	19	65.5		14	48.3		18	62		8	27.6	
B	**5**	19	17	89.5		11	57.9		15	78.9		1	5.3	
B	**6**	29	25	86.2		12	41.4		25	86.2		4	13.8	
B	**7**	21	19	90.5		10	50		19	90.5		6	28.6	

ML Chi Square statistics [#]significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

3.3.2.4 Learners' attitude towards milk

Though no significant differences were found between any of the groups when their attitude towards milk was evaluated a higher percentage of learners in school B like drinking milk (78.5% in school A, n=91; 83.7% in school B, n=118) (Table 3.20). During the focus group discussions, the majority of learners in all the groups mentioned that they like milk and drink it. There were also those few who were allergic or who did not like it. Some also mentioned that they preferred flavoured milk (Appendix K).

Table 3.20: "I like drinking milk" (n=257)

School	Grade	N	Yes (n)	%	No (n)	%	Do not know (n)	%	P
A*	All	116	91	78.5	21	18.1	4	3.5	0.39
B**	All	141	118	83.7	17	12	6	4.3	
A	Boys	44	35	79.6	7	15.9	2	4.6	0.5
B	Boys	56	47	83.9	5	8.9	4	7.1	
A	Girls	72	56	77.8	14	19.4	2	2.8	0.65
B	Girls	85	71	83.5	12	14.1	2	2.4	
A	2	10	8	80	1	10	1	10	0.83
B	2	19	15	79	3	15.8	1	5.3	
A	3	20	14	70	6	30	0	0	0.21
B	3	24	20	83.3	3	12.5	3	12.5	
A	4	20	18	90	2	10	0	0	0.06
B	4	29	27	93.1	0	0	2	6.9	
A	5	22	17	77.3	4	18.2	1	4.6	0.21
B	5	19	18	94.7	1	5.3	0	0	
A	6	22	17	77.3	4	18.2	1	4.6	0.96
B	6	29	22	75.9	6	20.7	1	3.5	
A	7	22	17	77.3	4	18.2	1	4.6	0.9
B	7	21	16	76.2	4	19.1	1	4.8	
A	Boys	44	35	79.6	7	15.9	2	4.6	0.8
A	Girls	72	56	77.8	14	19.4	2	2.8	
B	Boys	56	47	83.9	5	8.9	4	7.1	0.28
B	Girls	85	71	83.5	12	14.1	2	2.4	
A	2	10	8	80	1	10	1	10	
A	3	20	14	70	6	30	0	0	
A	4	20	18	90	2	10	0	0	
A	5	22	17	77.3	4	18.2	1	4.6	0.7
A	6	22	17	77.3	4	18.2	1	4.6	
A	7	22	17	77.3	4	18.2	1	4.6	
B	2	19	15	79	3	15.8	1	5.3	
B	3	24	20	83.3	3	12.5	3	12.5	
B	4	29	27	93.1	0	0	2	6.9	
B	5	19	18	94.7	1	5.3	0	0	0.2
B	6	29	22	75.9	6	20.7	1	3.5	
B	7	21	16	76.2	4	19.1	1	4.8	

*School A = nutritionally-regulated tuck shop; ** School B = conventional tuck shop

3.3.3 Learners' healthy and unhealthy eating behaviours

To evaluate behaviour,the various focus groups were asked how many times per day they eat, what they eat for breakfast and what their favourite foods were. To test their health behaviour learners had to select items for their own lunchbox when they completed the questionnaire.

3.3.3.1 The number of times per day learners eat

Learners in all the focus group discussions were asked how many times they eat per day.In most groups learners eat three to four times a day(Table 3.21). Certain extreme eating behaviours were reported ranging from "once per day" to "I like food a lot" and "9 times".

Table 3.21: Number of times grade 2 to 7 learners in a school with a nutritionally-regulated tuck shop and a school with a conventional tuck shop eat during the day (n=72)

Grade	School A* (n=36)		School B** (n=36)	
	In general	Extreme cases	In general	Extreme cases
2	3-5 times	Many times more. "I like food a lot" A_{food} Eat in-between.	4 times	9 times
3	4 times	6 times Many times. "only six times a day" B_{eat}	3 times	"eat whenever I want to" B_{eat} "once per day" B_{eat}
4	3-4 times	Fruit in-between B_{fruit}	3-4 times	-
5	3-4 times	-	4 times	-
6	1 - 2 times 3 times	4 times	3-4 times	When hungry Six times - "because I am very hungry" B_{eat}
7	5 times	4 times	3 - 4 times	-

*School A = nutritionally-regulated tuck shop; ** School B = conventional tuck shop
A_{food}= Attitude towards food in general, B_{eat}= eating behaviour,B_{fruit}= fruit eating behaviour

3.3.3.2 Food consumed for breakfast

Almost all the learners indicated that they eat breakfast, with the exception of a few girls who mentioned that they only sometimes eat breakfast (school B: grade 2 and 7) and a few

indicated "if there is time". A variety of cereals seem to be the most popular breakfast food consumed by all learners. The younger learners (school A: grade 2 to 4 and school B: grade 2 to 5) mentioned that they liked chocolate cereals. At both schools most groups mentioned that they eat healthier, high fibre cereals like Pronutro, Weetbix, All bran flakes and also whole wheat bread (Table 3.22).

Table 3.22: Types of food consumed for breakfast by grade 2 to 7 learners in a school with a nutritionally-regulated tuck shop and a school with a conventional tuck shop (n=72)

Grade	School A* (n=36)	School B** (n=36)
2	Variety of cereals. Chocolate cereals the most popular. Other: Cheerios, ProNutro, Maize porridge	Cereals are preferred. Milo cereals most popular. Other: fish, toast
3	Cereals the most popular-Rice Krispies, milo cereal. Other: bacon, eggs, bread, fruit	Variety of cereals-corn flakes, chocolate cereal, weetbix. Other: eggs, toast.
4	Variety of cereals- Chocolate cereal, Weetbix, Rice krispies, Corn flakes. Other: Bacon and eggs	Variety of cereals- Milo cereal,weetbix, pronutro, Coco pops. Maize porridge
5	Cereals. Other: eggs, toast, coffee and biscuits	Variety of cereals,- Milo/Coco Pops, All bran flakes, weetbix, cheerios. Maize porridge
6	Cereals, wholewheat bread, eggs, meat leftovers.	Cereals. Eggs and toast
7	Variety of cereals-muesli, rice krispies, weetbix. Bacon & eggs ("spoiled that morning") P_{gen}	Cereals-weetbix, corn flakes; sandwich, rusks

*School A = nutritionally-regulated tuck shop; ** School B = conventional tuck shop
P_{gen}= general perception

3.3.3.3 Learners' behaviour when selecting favourite foods

To evaluate the eating behaviours of learners the focus groups were given the opportunity to discuss their favourite food choices. Favourite foods were categorised as favourites in general, at home, in lunchboxes and at school (Table 3.23).

Learners from all the grades and both shools viewed take aways and various types of meat as their favourite foods, in general and at home ("Meat, when my dad wants to spoil me"). Pasta was also popular (lasagne, noodles, macaroni). The choices are generally high in energy and fat such as hamburgers, pizzas hot dogs and pies and included white bread with

chocolate spread or peanut butter and syrup. It was interesting to note that five of the six groups (grade 2 to 6) in school A mentioned fruit as a favourite, with only two groups (grades 4 and 6) in school B. In both schools none of the grade 7 groups mentioned fruit as a favourite food item.

Sandwiches were the most popular item for lunchboxes. Learners like sandwiches with one or a combination of the following spreads and fillings: syrup, jam, peanut butter, cheese, meat (polony, ham, biltong) and vegetables. Many of the learners also liked hot dogs. In some cases sweets are included in lunchboxes. From grade 3 to 6, fruit is also mentioned, sometimes combined with sweets (Grade 6 School B). No clear differences between the schools were detected.

In the discussions of favourite food items eaten at school, the availability of the different types of tuck shop foods influenced the learners food and beverage choices. In the case of the nutritionally-regulated tuck shop, the learners mentioned the tuck shop's sandwiches, pancakes, tortillas, samoosas, fruit and the water they buy at the tuck shop. In the case of the conventional tuck shop, the learners referred to their tuck shop's hot dogs, pies, pizza, toasted sandwiches and filled pita bread. Some comments revealed interesting preferences and perceptions: Chips and hot dogs "are not food" (grade 2, school B), "brown bread yummies" (grade 3 school B), "Everything is nice except vegetables, but vegetables are important"(grade 4, school A), "I like home-cooked food, not take aways" (grade 4, school A) and "crazy about fruit" (grade 6, school A).

Table 3.23: The favourite food choices of grade 2 to 7 learners (n=72)

Grade	School A* (n=36)				School B** (n=36)			
	In general	At home	Lunchbox	At school	In general	At home	Luncbox	At school
2	Hot dog, hamburger, pizza, lasagne. "Like everything"	Meatballs, "braaivleis" #, "potjiekos" #, lasagne.	Hotdogs Sandwich	Popcorn Watermelon Pancakes Slushy	Take away food (pizza, KFC); hot dogs, pasta	Chips, meat, pasta, fish, hot dogs. No favourite	Hot dogs & chips, sandwiches with polony & cheese or mayonnaise	Sweets, hot dogs, pie and tuck shop's pizza
3	Chips, viennas, pizza, pork, "vetkoek" #, croissant, lots of meat, prawns & calamari	Tuna dish, pasta, bacon & egg, piece of meat, leg of lamb, chips, vienna, polony	Sandwich with meat, fruit, snackwich, chocolate/Sweets, yoghurt, doughnut	Hamburger, Samoosas, water at tuck shop, tortillas, fruit, "vetkoek" #, pizza	Bacon, pizza, noodles, bread, nuggets, pumpkin	Brown bread, Two minute noodles, chicken, pizza , milk, egg	Hot dogs, sandwiches (with syrup marmite, cheese, peanut butter, cheese spread)	Hot dog, pizza pie, sandwich with peanut butter & syrup or jam, beef burger, sausage roll.
4	Fruit, Home cooked food	Toasted cheese, meat, spaghetti bolognaise, fruit, "everything".	Sandwich with jam; cheese spread, peanut butter & syrup, polony. "Sweetie", dried fruit	Sandwich with jam, pancakes, "Tuck shop!", tuck shop's pies, samoosas, sour sweets, chicken mayo sandwiches	Meat is a big favourite (Steak, meat, ribs). Other: Soup, eggs	Ribs, corn, pasta	Chocolates, marmite sandwich, fruit, noodles, yoghurt	"Tuck shop!", hot dog, fruit, ham & cheese
5	Pumpkin, bacon, "pap & wors"#, hot dogs	Meat, cereal, "don't know"	Fruit, popcorn, crisps, sandwich with peanut butter, biltong, cheese.	Meat "boerewors#, hamburger, sausage, biltong) sandwiches, fruit.	Steak, chops, chicken, ribs.	Pasta, soup	Sandwiches with chocolate spread, cheese spread, ham & cheese, hot dog.	Pita, ham & cheese, hot dog
6	Fruit, pizza, meat, pasta	Two-minute noodles, chicken, meat, fruit, leftovers.	Sandwich with a fruit. hot dog with a fruit , nuts.	Fruit, sandwich	Burgers, russian & chips, McDonald's spicy Cajun, ham & cheese, "braaivleis" #.	Chicken, snackwiches, cooked meal, meat.	Fruit, Fruit with little bit of sweets, snackwich, sandwiches.	Tuck shop's chicken burgers, ham & cheese, pepper steak, doughnuts.
7	Mince, pizza, lasagne, macaroni, any meat	Pasta, meat	Biltong, also on bread, cupcake, ham, egg on bread, No lunchbox	Pancakes, brownies	Lasagne, chicken, chicken pie, cooked meal, oxtail	Lasagne, chicken, chicken pie, noodles, pumpkin	Ham and cheese, sandwich (ham or marmite), chicken mayo, coco pop bar	Biltong, pie, pita bread

*School A = nutritionally-regulated tuck shop; **School B = conventional tuck shop

#braaivleis = barbecued meat; vetkoek = dough deep-fried in oil; potjiekos = stew; pap & wors = sausage and porridge; boerewors=type of traditional sausage

3.3.3.4 Learners' behaviour when asked to select items for their own lunchbox

To test behaviour learners had to indicate what food item (pie or sandwich), beverage (juice, cordial, milk or carbonated cool drink) and snack (fruit, raisins, sweet or chocolate) they would select for their lunchbox (Table 3.24-3.26).

A significant difference was found in grades 5 and 6 learners. In School A, 68.2% (n=15) of grade 5 learners chose the pie compared to 78.9% (n=15) of grade 5 learners in school B who chose the sandwich (p=0.002). In contrast, in school A, 68.2% (n=15) of grade 6 learners, chose the sandwich compared to school B where 65.5% (n=19) of grade 6 learners chose the pie (p=0.02). In school B a significant difference (p=0.04) between the age groups was found, the oldest learners (65.5% in grade 6, n=19; 61.9% in grade 7, n=13) chose the sandwich while the majority of grade 5 learners chose the pie (78.9%, n=15) (Table 3.24).

Table 3.24: Grade 2 to 7 learners' choice between a pie and a sandwich for their lunchboxes (n=257)

School	Grade	N	Pie (n)	%	P	Sandwich (n)	%	p
A*	**All**	116	61	52.6	0.56	55	47.4	0.72
B**	**All**	141	69	48.9		70	49.7	
A	**Boys**	44	21	44	0.35	23	52.3	0.26
B	**Boys**	56	32	56		23	41	
A	**Girls**	72	40	55.6	0.13	32	44.4	0.18
B	**Girls**	85	37	43.5		47	55.3	
A	**2**	10	6	60	0.36	4	40	0.36
B	**2**	19	8	42.1		11	57.9	
A	**3**	20	13	65	0.2	7	35	0.32
B	**3**	24	11	45.8		12	50	
A	**4**	20	7	35	0.35	13	65	0.24
B	**4**	29	14	48.3		14	48.3	
A	**5**	22	15	68.2	**0.002**[#]	7	31.8	**0.002**[#]
B	**5**	19	4	21.1		15	78.9	
A	**6**	22	7	31.8	**0.02**[#]	15	68.2	**0.02**[#]
B	**6**	29	19	65.5		10	34.5	
A	**7**	22	13	59.1	0.85	9	40.9	0.85
B	**7**	21	13	61.9		8	38.1	
A	**Boys**	44	21	47.7	0.41	23	52.3	0.41
A	**Girls**	72	40	55.6		32	44.4	
B	**Boys**	56	32	57.1	0.11	23	41.1	0.1
B	**Girls**	85	37	43.5		47	55.3	
A	**2**	10	6	60		4	40	
A	**3**	20	13	65		7	35	
A	**4**	20	7	35	0.06	13	65	0.06
A	**5**	22	15	68.2		7	31.8	
A	**6**	22	7	31.8		15	68.2	
A	**7**	22	13	59.1		9	40.9	
B	**2**	19	8	42.1		11	57.9	
B	**3**	24	11	45.8		12	50	
B	**4**	29	14	48.3	**0.04**[#]	14	48.3	**0.04**[#]
B	**5**	19	4	21.1		15	78.9	
B	**6**	29	19	65.5		10	34.5	
B	**7**	21	13	61.9		8	38.1	

ML Chi Square statistics [#]significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

Significant differences ($p<0.05$) were found in the choice of beverage amongst learners. In school A, boys (50%, n=22) as well as learners in grade 4 (70%, n=14) and grade 6 (59.1%, n=13), were more likely to choose juice, while the grade 7's (40.9%, n=9) chose carbonated cool drink. In school B more boys (41%, n=23) and grade 6's (59.1%, n=13) chose carbonated cool drink while the grade 7's (71.4%, n=15) rather chose juice. In school A none of the grade 4 learners chose milk, thus a significant difference was found when compared to grade 4 learners in school B ($p=0.009$) and compared to other age groups in school A ($p=0.048$). In school B the grade 5 (10.5%, n=2) and 7 learners (9.5%, n=2) chose less carbonated cool drink ($p=0.01$) compared to the other age groups in this school. Significant differences ($p< 0.05$) between genders were also found. In school B the girls (52.9%, n=45) preferred juice ($p=0.002$), while more boys (41.1%, n=23) chose carbonated cool drink ($p=0.004$). In school A more boys (25%, n=11) preferred milk ($p=0.03$) when compared to girls (Table 3.25).

Table 3.25: Grade 2 to 7 learners'choices for beverages in their lunchboxes (n=257)

School	Grade	N	Juice (n)	%	P	Milk (n)	%	P	Carbonated cool drink (n)	%	p	Cordial cool drink (n)	%	p
A*	All	116	58	50	0.23	18	15.5	0.76	24	20.7	0.19	15	12.9	0.77
B**	All	141	60	42.5		20	14.2		39	27.7		20	14.2	
A	Boys	44	22	50	**0.02#**	11	25	0.52	8	18.2	**0.01#**	3	6.8	0.49
B	Boys	56	15	26.8		11	19.6		23	41		6	10.7	
A	Girls	72	36	50	0.71	7	9.72	0.86	16	22.2	0.6	12	16.7	0.97
B	Girls	85	45	52.9		9	10.6		16	18.8		14	16.5	
A	2	10	3	30	0.83	2	20	0.7	1	10	0.44	4	40	0.45
B	2	19	5	26.3		5	26.3		4	21		5	26.3	
A	3	20	10	50	0.4	6	30	0.3	2	10	0.11	1	5	0.66
B	3	24	9	37.5		4	16.7		7	29.2		2	8.3	
A	4	20	14	70	**0.046#**	0	0	**0.009#**	5	25	0.48	1	5	0.79
B	4	29	12	41.4		6	20.7		10	34.5		1	3.5	
A	5	22	9	40.9	0.45	5	22.7	0.29	4	18.2	0.49	4	18.2	0.53
B	5	19	10	52.6		2	10.5		2	10.5		5	26.3	
A	6	22	13	59.1	**0.044***	2	9.1	0.77	3	13.64	**0.007#**	4	18.2	0.67
B	6	29	9	31		2	6.9		14	48.3		4	13.8	
A	7	22	9	40.9	**0.04#**	3	13.6	0.31	9	40.9	**0.01#**	1	4.6	0.26
B	7	21	15	71.4		1	4.8		2	9.5		3	14.3	
A	Boys	44	22	50	1	11	25	**0.03#**	8	18.2	0.6	12	16.7	0.11
A	Girls	72	36	50		7	9.7		16	22.2		3	6.8	
B	Boys	56	15	26.8	**0.002#**	11	19.6	0.13	23	41.1	**0.004#**	6	10.7	0.33
B	Girls	85	45	52.9		9	10.6		16	18.8		14	16.5	
A	2	10	3	30	0.21	2	20	**0.048#**	1	10	0.15	4	40	0.07
A	3	20	10	50		6	30		2	10		1	5	
A	4	20	14	70		0	0		5	25		1	5	
A	5	22	9	40.9		5	22.7		4	18.2		4	18.2	
A	6	22	13	59.1		2	9.1		3	13.64		4	18.2	
A	7	22	9	40.9		3	13.6		9	40.9		1	4.6	
B	2	19	5	26.3	**0.03#**	5	26.3	0.25	4	21	**0.01#**	5	26.3	0.14
B	3	24	9	37.5		4	16.7		7	29.2		2	8.3	
B	4	29	12	41.4		6	20.7		10	34.5		1	3.5	
B	5	19	10	52.6		2	10.5		2	10.5		5	26.3	
B	6	29	9	31		2	6.9		14	48.3		4	13.8	
B	7	21	15	71.4		1	4.8		2	9.5		3	14.3	

ML Chi Square statistics #significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

When given the option of choosing a snack for their lunchbox, significant differences (p<0.05) were found. More learners in the school with the nutritionally-regulated tuck shop (school A) chose sweets for their lunchboxes, as well as the girls, grade 2 and grade 5 learners. In school A only 9.1% (n=2) of the grade 5 learners chose a fruit (p=0.02) for their lunchbox compared to 30% and more of the learners in the other age groups of school A that chose fruit. In the same school more boys (15.9%, n=7) chose raisins (p=0.03) compared to girls (4.2%, n=3)(Table 3.26).

Table 3.26: Grade 2 to 7 learners' choices for snacks in their lunchboxes (n=257)

School	Grade	N	Sweets (n)	%	P	Chocolate (n)	%	p	Fresh fruit (n)	%	P	Raisins (n)	%	P
A*	All	116	20	17.2	**0.02**#	42	36.2	0.56	44	37.9	0.68	10	8.6	0.59
B**	All	141	11	7.8		56	39.7		57	40.4		15	10.6	
A	Boys	44	5	11.4	0.47	16	36.4	0.63	16	36.4	0.9	7	15.9	0.45
B	Boys	56	4	7.1		23	41		21	37.5		6	10.7	
A	Girls	72	15	20.8	**0.02**#	26	36.1	0.73	28	38.9	0.66	3	4.2	0.12
B	Girls	85	7	8.2		33	38.8		36	42.4		9	10.6	
A	2	10	2	20	**0.03**#	5	50	0.68	3	30	0.93	0	0	0.18
B	2	19	0	0		11	57.9		6	31.58		2	10.5	
A	3	20	2	10	0.79	8	40	0.45	9	45	0.96	1	5	0.66
B	3	24	3	12.5		7	29.2		11	45.8		2	8.3	
A	4	20	1	5	0.79	6	30	0.74	11	55	0.64	2	10	0.97
B	4	29	1	3.5		10	34.5		14	14		3	10.3	
A	5	22	6	27.3	**0.004**#	11	50	0.39	2	9.1	**0.005**#	3	13.6	0.85
B	5	19	0	0		7	36.8		9	47.4		3	15.8	
A	6	22	5	22.7	0.41	5	22.7	**0.03**#	9	40.9	0.47	3	13.6	0.18
B	6	29	4	13.8		15	51.7		9	31		1	3.5	
A	7	22	4	18.2	0.73	7	31.8	0.82	10	45.5	0.62	1	4.6	0.13
B	7	21	3	14.3		6	28.6		8	38.1		4	19.1	
A	Boys	44	5	11.4	0.18	16	36.4	0.98	16	36.4	0.79	7	15.9	**0.03**#
A	Girls	72	15	20.8		26	36.1		28	38.9		3	4.2	
B	Boys	56	4	7.1	0.81	23	41.1	0.8	21	37.5	0.6	6	10.7	0.9
B	Girls	85	7	8.2		33	38.8		36	42.4		9	10.6	
A	2	10	2	20	0.4	5	50	0.4	3	30	**0.02**#	0	0	0.54
A	3	20	2	10		8	40		9	45		1	5	
A	4	20	1	5		6	30		11	55		2	10	
A	5	22	6	27.3		11	50		2	9.1		3	13.6	
A	6	22	5	22.7		5	22.7		9	40.9		3	13.6	
A	7	22	4	18.2		7	31.8		10	45.5		1	4.6	
B	2	19	0	0	0.07	11	57.9	0.22	6	31.58	0.7	2	10.5	0.54
B	3	24	3	12.5		7	29.2		11	45.8		2	8.3	
B	4	29	1	3.5		10	34.5		14	14		3	10.3	
B	5	19	0	0		7	36.8		9	47.4		3	15.8	
B	6	29	4	13.8		15	51.7		9	31		1	3.5	
B	7	21	3	14.3		6	28.6		8	38.1		4	19.1	

ML Chi Square statistics #significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

3.4 A COMPARISON OF PRIMARY SCHOOL LEARNERS' PERCEPTIONS, ATTITUDE AND BEHAVIOUR TOWARDS HEALTHY EATING ACROSS YEAR GROUPS AND BETWEEN GENDERS

In this section differences across year groups and between genders for specific perceptions, attitudes and behaviour are summarised with the purpose to answer the secondary objective: to determine if primary school learners' perceptions, attitudes and behaviour towards healthy eating differ across different year groups and between genders.

3.4.1 Learners' perceptions towards healthy eating across year groups and between genders

During the focus group discussions the younger learners in school A perceived their nutritionally-regulated tuck shop as healthy and they thought that other schools should also have the same type of tuck shop. To the contrary, most of the older learners held the perception that there was no need for a "healthy" tuck shop. Significant differences ($p<0.05$) found between the age groups in school A show that less of the grade 7 learners had the perception that "children must first eat healthy food before they can eat sweets" compared to the other age groups.

Learners' perceptions related to fat showed that there was some confusion about the nutritional quality of oily foods and fats in the diet. In the focus group discussions the younger learners (grade 2 to 5), in both schools, misunderstood the question about "food that makes you hand oily" while only the older learners (grade 6 and 7) could relate oily hands to food that contains fat. It was found that the older learners shared more educated views on healthy eating than the younger learners and it was reported that more than 90% of grade 5 and 7 learners in school B perceived fatty food as unhealthy (Table 3.5), but despite the educated views only a third of the grade 6 and 7 learners in school B thought that the intake of oily foods should be limited.

No clear differences in perceptions about food and healthy eating were found between boys and girls.

3.4.2 Learners' attitudes towards healthy eating across year groups and between genders

Younger learners, especially in school A were more positive towards their nutritionally-regulated tuck shop (Table 3.12). A similar trend was seen in both schools were the younger learners in grade 2 and 3 thought that a tuck shop must not sell unhealthy items, in contrast to the older learners who either disagreed or were unsure (Table 3.11).

Younger learners were not very positive toward vegetables and the attitude of some the young learners was not positive ("healthy, but tastes bad", "I think I do not like vegetables") (Appendix K). This negative attitude of the younger learners was confirmed by the questionnaire when less of the grade 2's in both schools did not like certain vegetables as much as the older age groups in each of the schools. The same trend was found for various fruit, which showed that the grade 2's did not like certain fruit as much as the older learners in their school ($p<0.05$) (Tables 3.18 and 3.19).

A gender difference was detected in the grade 6 focus group of school A, where the three girls were very unenthusiastic about their tuck shop while the boys were much more positive. Another difference between genders was that girls in both schools liked certain fruits and vegetables significantly ($p<0.05$) more than boys (Tables 3.14-3.16, 3.18, 3.19).

3.4.3 Learners' healthy and unhealthy eating behaviours across year groups and between genders

The behaviour of mostly the younger learners, in both schools, showed that there were extreme cases where the learners ate several meals per day or just once per day. Whereas most of the older learners ate 3 to 4 times per day. Some girls in grades 2 and 7 in school B did not eat breakfast everyday like the rest of the learners in the other age groups. A difference in behaviour was found for breakfast cereals, where the younger learners up to the grade 5 groups mentioned chocolate coated cereals as a breakfast option.

The oldest learners (grade 7 in both schools) did not mention fruit as a favourite food item, while the youngest learners (grade 2's) was the only group in school A that did not mention that they buy fruit from the tuck shop (Table 3.23). In Table 3.26 it can be seen that the grade 5 group in school A was the group who chose the least amount of fruit for their lunchbox and in Table 3.24 is it seen that more learners in this group chose a pie for their lunchbox. Table 3.25 shows that more girls in school B chose juice while boys in school B chose more carbonate cooldrink and in school A more boys compared to girls chose milk for

their lunchboxes. Healthy behaviour of grade 6 and 7 learners in school B were found when most of these learners rather chose a sandwich for their lunchbox than a pie (Table 3.24)

3.5 GRADE 2 to 7 LEARNERS' LUNCHBOX CONTENTS AND THE NUTRITIONAL ADEQUACY THEREOF

One of the secondary objectives of this study was to establish what primary school learners bring to school in their lunchboxes and to compare the difference in nutritional composition of the lunchboxes in the two schools, a school with a conventional tuck shop and a school with a nutritionally-regulated tuck shop.

3.5.1 The number of times per week learners brought a lunchbox to school

Most learners brought a lunchbox to school on a daily basis (81% in school A, n=94; 82.9% in school B, n = 117)(Table 3.27).

Table 3.27: Number of times per week grade 2 to 7 learners brought a lunchbox to school (n=257)

School	Grade	N	Daily (n)	%	p	Most days (n)	%	p	Almost never (n)	%	p	Never (n)	%	P
A*	All	116	94	81	0.68	15	12.9	0.34	3	2.6	0.46	4	3.5	0.96
B**	All	141	117	82.9		13	9.2		6	4.3		5	3.6	
A	Boys	44	34	77.3	0.95	5	11.4	0.86	2	4.6	0.85	3	6.8	0.9
B	Boys	56	43	76.8		7	12.5		3	5.4		3	5.4	
A	Girls	72	60	83.3	0.51	10	13.9	0.16	1	1.4	0.38	1	1.4	0.66
B	Girls	85	74	87		6	7		3	3.5		2	2.4	

*School A = nutritionally-regulated tuck shop; ** School B = conventional tuck shop

3.5.2 The lunchbox contents of learners

During the focus group discussions all the groups mentioned sandwiches with different fillings as one of the favourite items for their lunchboxes. The majority of learners in both schools had a sandwich in their lunchbox, mostly made with white bread (56% in school A; n=65; 58.2% in school B, n=82) and fewer had a brown bread sandwich (21.5% in school A,

n=25; 15.6% in school B, n=22). When lunchbox contents between the groups in the two schools was compared, highly significant difference ($p<0.001$) was found as learners in school A had more fruit (40.5%, n=47). Learners in school A also had significantly more muffins (10.3%, n=12) and water (43.1%, n=50) in their lunchboxes ($p<0.05$) and interestingly, also more unhealthy items such as sweets (19.5%, n=23) and crisps (16.4%, n=19). Girls in school A also had more sweets (25%, n=18)($p=0.004$) and crisps (16.7%, n=12)($p=0.03$) in their lunchboxes when compared to girls in school B (Table 3.28 (a) and 3.28 (b)). A significant difference was found between the age groups in school B since grade 7 learners brought more water (52.4%, n=11)($p=0.01$) to school compared to the other grades.

Table 3.28(a): The healthy items in grade 2 to 7 learners' lunchboxes (n=257)

School	Grade	N	Brown bread (n)	%	P	Fresh fruit (n)	%	P	Muffin (n)	%	p	Water (n)	%	P
A*	**All**	116	25	21.5	0.22	47	40.5	**0.00001**[#]	12	10.3	**0.004**[#]	50	43.1	**0.003**[#]
B**	**All**	141	22	15.6		22	15.6		3	2.1		36	25.5	
A	**All Boys**	44	10	22.7	0.4	18	40.9	**0.0001**[#]	3	6.8	**0.02**[#]	18	40.9	**0.01**[#]
B	**All Boys**	56	9	16		5	8.9		0	0		10	17.9	
A	**All Girls**	72	15	20.8	0.37	29	40.3	**0.005**[#]	9	12.5	**0.03**[#]	32	44.4	0.07
B	**All Girls**	85	13	15.3		17	20		3	3.		26	30.6	
A	**2**	10	2	20	0.95	3	30	0.07	1	10	0.64	4	40	0.28
B	**2**	19	4	21		1	5.3		1	5.3		4	21	
A	**3**	20	3	15	0.88	9	45	**0.004**[#]	3	15	0.21	6	30	0.15
B	**3**	24	4	16.7		2	8.33		1	4.2		3	12.5	
A	**4**	20	7	35	0.58	9	45	**0.03**[#]	2	10	0.35	11	55	0.09
B	**4**	29	8	27.6		5	17.2		1	3.5		9	31	
A	**5**	22	2	9.1	0.88	4	18.2	0.84	1	4.6	0.26	9	40.9	0.54
B	**5**	19	2	10.5		3	15.8		0	0		6	31.6	
A	**6**	22	6	27.3	**0.04**[#]	11	50	**0.01**[#]	1	4.6	0.2	11	50	**0.001**[#]
B	**6**	29	2	6.9		5	17.2		0	0		3	10.3	
A	**7**	22	5	22.7	0.23	11	50	0.15	4	18.2	**0.02**[#]	9	40.9	0.45
B	**7**	21	2	9.5		6	28.6		0	0		11	52.4	
A	**Boys**	44	10	22.7	0.81	18	40.9	0.95	3	6.8	0.32	18	40.9	0.71
A	**Girls**	72	15	20.8		29	40.3		9	12.5		32	44.4	
B	**Boys**	56	9	16.1	0.9	5	8.9	0.07	0	0	0.08	10	17.9	0.08
B	**Girls**	85	13	15.3		17	20		3	3.5		26	30.6	
A	**2**	10	2	20	0.4	3	30	0.19	1	10	0.61	4	40	0.68
A	**3**	20	3	15		9	45		3	15		6	30	
A	**4**	20	7	35		9	45		2	10		11	55	
A	**5**	22	2	9.1		4	18.2		1	4.6		9	40.9	
A	**6**	22	6	27.3		11	50		1	4.6		11	50	
A	**7**	22	5	22.7		11	50		4	18.2		9	40.9	
B	**2**	19	4	21	0.3	1	5.3	0.36	1	5.3	0.5	4	21	**0.01**[#]
B	**3**	24	4	16.7		2	8.33		1	4.2		3	12.5	
B	**4**	29	8	27.6		5	17.2		1	3.5		9	31	
B	**5**	19	2	10.5		3	15.8		0	0		6	31.6	
B	**6**	29	2	6.9		5	17.2		0	0		3	10.3	
B	**7**	21	2	9.5		6	28.6		0	0		11	52.4	

ML Chi Square statistics [#]significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

Table 3.28(b): The unhealthy items in grade 2 to 7 learners' lunchboxes

School	Grade	N	White bread (n)	%	p	Chips (n)	%	p	Sweets (n)	%	P
A*	**All**	116	65	56	0.73	19	16.4	**0.033#**	23	19.8	**0.022#**
B**	**All**	141	82	58.2		11	7.8		10	7	
A	**All Boys**	44	26	59	0.87	7	15.9	0.45	5	11.4	0.3
B	**All Boys**	56	34	60.7		6	10.7		3	5.4	
A	**All Girls**	72	39	54.2	0.77	12	16.7	**0.03#**	18	25	**0.004#**
B	**All Girls**	85	48	56.5		5	5.9		7	8.2	
A	**2**	10	5	50	0.9	0	0	-	0	0	0.05
B	**2**	19	10	52.6		0	0		4	21	
A	**3**	20	11	55	0.82	2	10	0.44	3	15	0.81
B	**3**	24	14	58.3		1	4.2		3	12.5	
A	**4**	20	12	60	0.74	5	25	0.17	4	20	0.05
B	**4**	29	16	55.2		2	6.9		1	3.5	
A	**5**	22	16	72.7	0.51	3	13.6	0.49	6	27.3	**0.049#**
B	**5**	19	12	63.2		2	10.5		1	5.3	
A	**6**	22	9	40.9	0.21	4	18.2	0.42	4	18.2	0.07
B	**6**	29	17	58.6		3	10.3		1	3.5	
A	**7**	22	12	54.6	0.62	5	22.7	0.23	6	27.3	**0.003#**
B	**7**	21	13	61.9		2	9.5		0	0	
A	**Boys**	44	26	59.1	0.6	7	15.9	0.91	5	11.4	0.07
A	**Girls**	72	39	54.2		12	16.7		18	25	
B	**Boys**	56	34	60.7	0.62	6	10.7	0.3	3	5.4	0.5
B	**Girls**	85	48	56.5		5	5.9		7	8.2	
A	**2**	10	5	50	0.42	0	0	0.31	0	0	0.29
A	**3**	20	11	55		2	10		3	15	
A	**4**	20	12	60		5	25		4	20	
A	**5**	22	16	72.7		3	13.6		6	27.3	
A	**6**	22	9	40.9		4	18.2		4	18.2	
A	**7**	22	12	54.6		5	22.7		6	27.3	
B	**2**	19	10	52.6	0.9	0	0	0.41	4	21	0.09
B	**3**	24	14	58.3		1	4.2		3	12.5	
B	**4**	29	16	55.2		2	6.9		1	3.5	
B	**5**	19	12	63.2		2	10.5		1	5.3	
B	**6**	29	17	58.6		3	10.3		1	3.5	
B	**7**	21	13	61.9		2	9.5		0	0	

ML Chi Square statistics #significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

Some significant differences (p<0.05) were also found for sandwich fillings margarine, fish spread, jam, cheese and marmite. Significantly more learners in school B (14.9%, n=21)(p=0.03), as well as boys (16%, n=9)(p=0.01) and grade 4's (27.6%, n=8)(p=0.002) had the salty spread, Marmite on their sandwiches compared to the same groups in school A. A significant difference (p=0.046) was also found for jam spread since more learners in school A (13.8%, n=16) had jam on their sandwiches compared to learners in school B (Table 3.29).

Table 3.29: Spreads and fillings grade 2 to 7 learners had on their sandwiches

School	Grade	N	Margarine (n)	%	p	Marmite (n)	%	P	Cheese (n)	%	P	Jam (n)	%	p
A*	All	116	39	33.9	0.18	8	6.9	**0.03**#	30	25.9	0.39	16	13.8	**0.046**#
B**	All	141	37	26.4		21	14.9		30	21.3		9	6.4	
A	Boys	44	17	38.6	0.14	1	2.3	**0.01**#	15	34	**0.02**#	7	15.9	0.03
B	Boys	56	14	25		9	16		8	14.3		2	3.6	
A	Girls	72	22	31	0.59	7	9.7	0.4	15	20.8	0.46	9	12.5	0.38
B	Girls	85	23	27		12	14.1		22	25.8		7	8.2	
A	2	10	4	40	0.45	1	10	0.96	1	10	0.96	0	0	0.35
B	2	19	5	26.3		2	10.5		2	10.5		1	5.3	
A	3	20	4	20	0.48	2	10	0.32	7	35	0.47	2	10	0.44
B	3	24	7	29.2		2	20.8		6	25		1	4.2	
A	4	20	8	40	0.36	0	0	**0.002**#	4	20	0.38	7	35	0.08
B	4	29	8	27.6		8	27.6		9	31		4	13.8	
A	5	22	9	42.9	**0.0002**#	3	13.6	0.05	5	22.7	0.29	3	13.6	0.05
B	5	19	0	0		0	0		2	10.5		0	0	
A	6	22	7	31.8	0.95	2	9.1	0.25	7	31.8	0.74	1	4.6	0.84
B	6	29	9	31		6	20.7		8	27.6		1	3.5	
A	7	22	7	31.8	0.67	0	0	0.05	6	27.3	0.29	3	13.6	0.67
B	7	21	8	38.1		3	14.3		3	14.3		2	9.5	

ML Chi Square statistics #significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

3.6 PRIMARY SCHOOL LEARNER'S TUCK SHOP BUYING BEHAVIOURS

In this section the results for the secondary objective to establish what primary school learners buy at the tuck shop, are discussed.

3.6.1 The number of times per week learners bought from the tuck shop

A small percentage of learners indicated that they bought from the tuck shop on a daily basis (4.3% in school A, n=5; 6.4% in school B, n=9), while most bought from the tuck shop "almost never" (66.4% in school A, n=77; 69.5% in school B, n=98). A significant difference (p=0.047) was found between the grade 5 groups, where no grade 5's in school B indicated that they "never" bought from the tuck shop nor that they bought from the tuck shop on a "daily" basis. There was also a significant difference (p=0.035) between the responses of the grade 4 groups, since 13.8% (n=4) of grade 4's in school B indicated that they bought from the tuck shop on a daily basis, while no grade 4's in school A indicated that they bought from the tuck shop on a daily basis (Table 3.30).

Table 3.30: Number of times per week grade 2 to 7 learner bought from the tuck shop (n=257)

School	Grade	N	Daily (n)	%	p	Most days (n)	%	p	Almost never (n)	%	p	Never (n)	%	P
A*	All	116	5	4.3	0.46	23	19.8	0.56	77	66.4	0.59	11	9.5	0.49
B**	All	141	9	6.4		24	17		98	69.5		10	7	
A	Boys	44	2	4.5	0.58	10	22.7	0.7	26	59.1	0.47	6	13.6	0.28
B	Boys	56	4	7.1		11	19.6		37	66.1		4	7.1	
A	Girls	72	3	4.17	0.62	13	18.96	0.64	51	70.8	0.89	5	6.9	0.97
B	Girls	85	5	5.88		13	15.29		61	71.8		6	7	
A	2	10	0	0	0.35	2	20	0.78	7	70	0.83	1	10	0.64
B	2	19	1	5.2		3	15.8		14	73.7		1	5.26	
A	3	20	3	15	0.48	4	20	0.69	9	45	0.24	4	20	0.09
B	3	24	2	8.3		6	25		15	62.5		1	4.17	
A	4	20	0	0	**0.035**[#]	4	20	0.56	15	75	0.15	1	5	0.17
B	4	29	4	13.8		4	13.8		16	55.2		5	17.24	
A	5	22	2	9	0.11	6	27.3	0.64	11	50	0.051	3	13.6	**0.047**[#]
B	5	19	0	0		4	21		15	78.96		0	0	
A	6	22	0	0	0.28	2	9	0.6	19	86.36	0.34	1	4.5	0.72
B	6	29	1	3.45		4	13.8		22	75.9		2	6.9	
A	7	22	0	0	0.22	5	22.7	0.47	16	72.7	0.79	1	4.5	0.97
B	7	21	1	4.8		3	14.3		16	76.2		1	4.8	

ML Chi Square statistics [#]significant difference, p<0.05; *School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

3.6.2 The types of tuck shop items that learners bought, liked and disliked

At school A the learners liked a variety of the "healthy" items their tuck shop offered. The most liked items were the slushy (fruit juice with crushed ice) 41% (n=48), iced lollie (frozen diluted fruit juice) 33% (n=38), and juice (unsweetened)22% (n=26) (Table 3.31). Twenty two percent (n=26) of learners also liked the hot dogs that were available once per week on a Friday. Learners in this school mostly bought a slushy (8%, n=9), iced lollies (7%, n=8) or popcorn, hamburgers, samoosas[α] or muffins[α] (n=3, 3% each) (Table 3.31). During the discussions all the groups, except the grade 2 group mentioned that they also bought fruit from their nutritionally-regulated tuck shop (Table 3.32).

In school B, learners liked the carbonated cool drinks 47% (n=66) most, followed by pies 26% (n=37) and crisps21% (n=30). In this school the learners mostly bought sweets (13%, n=18), crisps (9%, n=13) and carbonated cool drink (6%, n=8) from the conventional tuck shop (Table 3.31).

[α] These items are regarded as healthy items since recipes were adapted to have a lower fat and sugar content

During the focus group discussions several learners indicated that they liked "everything" in the conventional tuck shop. Sweets (“ooo…sweeties!”), pies, hot dogs and crisps with cool drinks seemed to be very popular in all grades. Younger learners specifically mentioned the sweeter items like chocolates and sweets (Table 3.32).

In school A, some learners had a negative attitude towards their nutritionally-regulated tuck shop. Comments such as: "I want a real chocolate muffin, not with carrots in it” and "I do not buy there. My own food is much nicer" indicated negative attitudes (Table 3.32). Sixteen percent (n=19) of learners disliked the muffins, 12% (n=14) disliked the sugar free sweets and 10% (n=12) disliked the brownies[α] (Table 3.31).

The least liked items in school B were carbonated cool drink (18%; n=25), sweets (18%; n=25) and pies (13%; n=18) (Table 3.31). It is interesting to note that even though 18% (n=25) of learners disliked carbonated cool drink, nearly half of them (47%; n=66) indicated that they liked it. When asked to discuss what they disliked, large differences in opinions were found. However the items specifically mentioned broadly corresponded with the findings in the questionnaire i.e. carbonated cool drinks, certain types of pies (”russian roll” and “pizza pie”) and specific sweets (“sour”, “spicy”, “fudge”) (Table 3.32).

[α] These items are regarded as healthy items since recipes were adapted to have a lower fat and sugar content

Table 3.31: The tuck shop items that grade 2 to 7 learners liked, disliked and bought (n=257)

School A*	Liked		Disliked		Bought		School B**	Liked		Disliked		Bought	
n = 116	N	%	n	%	n	%	n = 141	N	%	N	%	n	%
DRINKS							**DRINKS**						
Slushy	48	**41**	6	5	9	8	Carbonated cool drink	66	**47**	25	18	8	6
Iced lollie	38	**33**	2	2	8	7	Iced lollie	16	11	8	6	6	4
Juice	26	**22**	3	3	2	2	Juice	11	8	-	-	-	-
Iced tea	3	3	1	1	-	-	Energade/ Powerade	21	15	6	4	1	1
Water, unflavoured	10	9	1	1	1	1	Water , unflavoured	16	11	1	1	4	3
Hot chocolate	3	3	2	2			Milo	1	1	-	-	1	1
Smoothie	6	5	2	2	2	2	Flavoured milk	1	1	-	-		
							Cordial	23	16	7	5	1	1
SNACKS							**SNACKS**						
Ice cream	3	3	-	-	-	-	Ice cream	4	3	1	1	-	-
Popcorn	21	18	7	6	3	3	Popcorn	1	1	-	-	-	-
Fruit	17	15	6	5	-	-	Fruit	6	4	3	2	-	-
Pancakes	14	12	1	1	2	2	Dounut	11	8	3	2	3	2
Muffin	13	11	19	16	3	3	Biscuits	1	1	1	1	-	-
Sweets	10	9	14	12	2	2	Sweets	25	18	25	18	18	13
Brownies	8	7	12	10	2	2	Tart	1	1	-	-	1	1
Peanuts	-	-	3	3	-	-	Peanuts			4	3	-	-
Dates	-	-	3	3	-	-	Crisps	30	**21**	6	4	13	9
							Chocolate	6	4	6	4	3	2
							Corn	3	2	-	-	1	1
							Biltong	6	4	1	1	1	1
							Dry wors	3	2	-	-	-	-
							Cupcake	-	-	-	-	1	1
FOOD							**FOOD**						
Hot dog	26	**22**	1	1	-	-	Hot dog	18	13	6	4	4	3
Samoosa	22	19	8	7	6	5	Pie	37	**26**	18	13	3	2
Sandwich	9	8	8	7	1	1	Sandwich	4	3	1	1	-	-
Hamburger	6	5	6	5	3	3	Burger	11	8	6	4	1	1
Vegetable	2	2	3	3	-	-	Pizza	4	3	4	3	-	-
Lunch	2	2	2	2	-	-	Ham&Cheese	16	11	1	1	3	2
Salad	-	-	2	2	1	1	Pita	16	11	1	1	-	-
Tortilla	-	-	1	1	1	1	Pasta	-	-	1	1	-	-
							Healthy food	-	-	1	1	-	-

*School A = nutritionally-regulated tuck shop;** School B = conventional tuck shop

Table 3.32: The types of tuck shop items that grade 2 to 7 learners liked/disliked and their suggestions (n=72)

SCHOOL A*			SCHOOL B**		
What they buy & like most	**What they dislike**	**Suggestions**	**What they buy & like most**	**What they dislike**	**Suggestions**
Grade 2			**Grade 2**		
Hot chocolate, chocolate muffins, slushy	Slushy, lollie, ice cream, the lunch, the sweets, mayonnaise on buns instead of margarine	Chocolate, peppermints, cheerios, cereal, lasagne, meat balls, ice cream.	"The food", sweets, chocolate, "hot dogs, hot dogs!"	Pie, sour sweets , fudge (differences in opinion here)	Coffee, tea, milk, easter eggs, other tasty chips, other types of sweets & cool drink, chocolate with biscuits.
Grade 3			**Grade 3**		
Slushy, water, pies, burgers, juice, pancakes, muffins, tortillas, fruit, sweets ("ooo sweeties!")	Nothing, iced lollie, popcorn, hamburgers-(dislike the sauce)	Carbonated drinks, "slap" (potato) chips, viennas, breakfast hamburger, chocolates	Big packets of crisps, pie, pizza, sweets, burgers, hot dog, iced lollie, everything, beef burger.	Nothing, biltong wheels, mints, sour sweets, spicy sweets, small packets of crisps	Ice cream, custard, pizza, sausage in dough, cheese burger, salad, "slap" (potato) chips, "koeksisters"#, waffle.
Grade 4			**Grade 4**		
Pie, sweeties, water, juice, iced lollie, sour sweets, slushy, sandwich, chicken mayo, hot dog, watermelon.	Nothing, sour sweets, popcorn, chicken mayo.	Ice cream, macaroni & cheese for lunch, tomato/ potato salad, chocolate, jungle/energy bars, energade , chappies	Pie & cool drink, hot dog & oros, Ham & cheese and cool drink chocolates , pies, sweets, doughnut, water	Energade, "like everything", coke, "don't know".	"Satisfied as it is", take aways, toffee apples, apples and fruit
Grade 5			**Grade 5**		
Iced lollies, hamburger, boerewors# dog, slushy, Pancakes, fruit salad.	Dried fruit, sweets, slushies, popcorn	"Lots of sweets", ice cream, biltong, "slap"(potato) chips, "don't know"	Lollies, big doughnut, hot dogs, small packet crisps with cool drink, sweets, iced lollie, pie, Oros, "everything"	"nothing"	Diet cool drink, spaghetti, soup, coffee, Milo, "braaivleis"#, chops
Grade 6			**Grade 6**		
popcorn, cool drink, slushy, iced lollie, smoothie, fruit, water, samoosa, popcorn, fruit.	Brownies, some sandwiches, muffin, fruit not fresh, cold pancakes	Energade, fresh fruit, cheaper cool drink, sweets	Coke, chicken burger, Oros, Ham & cheese, powerade, crisps , coke, chicken burger, iced lollie, sour sweets, "everything", fudge.	Nothing, except spicy sweets	Other types of chocolate, sausage & russian rolls, chocolate cake and cheese cake, "sandwich without tomato"
Grade 7			**Grade 7**		
Brownies, iced lollie, popcorn, watermelon, pancakes, smoothie, samoosa, hotdogs	"Secret muffins", sweets (too sour), slushy (only juice with ice), some salads, sandwiches not so fresh.	Sweets, carbonated cool drink, pizza, sweetened juice, vetkoek#, biltong wheels,	Chicken burger, pie, pita, cool drink, sweets, biltong wheels, fudge, iced lollie, crisps	Fruit, russian roll, type of cookies, sherbet, pizza pie	"Slap" (potato) chips, biltong, "braaivleis"#, "sour worms", "boerewors"# dogs

#Braaivleis = barbequed meat, boerewors =type of traditional sausage, vetkoek = dough deep fried in oil , koeksisters = traditional dessert

* School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

3.6.3 The types of tuck shop items that learners suggested should be in their tuck shops

In school A the learners indicated that they would rather like to have a variety of conventional tuck shop items such as sweets or chocolates (52%, n=61), carbonated cool drinks (28%, n=32), crisps (16%, n=19), ice cream (13%, n=15), pizza (13%, n=15) and “vetkoek” (dough deep fried in oil) (10%, n=12) (Table 3.33). The same was found in the focus groups discussions where some of the learners were longing for the conventional tuck shop the school used to have (”Yes, I want that tuck shop!”, “ooo sweeties", "energy bars and Energade are necessary before sport games”). There were, however, also suggestions for fresh fruit and a variety of salads (although one said: "I don’t like salad"). Other requests included cooked meals like lasagne, macaroni and cheese and meatballs (Table 3.32).

When asked to make suggestions, the learners in school B indicated that they were mostly satisfied with their conventional tuck shop, but had suggestions for larger variety of beverages (coffee, tea, Milo and milk), snacks (other types of sweets and chocolates) and traditional foods like “boerewors”(type of traditional sausage),hot dogs and "braaivleis" (barbequed meat) were mentioned, as well as, take away food like potato chips and pizza and traditional desserts like “koeksisters”(Table 3.32). Eleven percent (n=16) indicated that they would like to be able to buy fruit from the conventional tuck shop while 11% (n=16) also indicated that they would like a larger variety of sweets and chocolates (Table 3.33).

Table 3.33: The types of tuck shop items that grade 2 to 7 learners suggested should be in their tuck shops (n=257)

School A*			School B**		
Suggestion	**n**	**%**	**Suggestions**	**n**	**%**
Healthy items			**Healthy items**		
Fruit juices, other types	8	7	Fruit juices, other types	13	9
Fruit, other types	5	4	Fruit	16	11
Vegetables, other types	2	2	Vegetables	4	3
Sandwiches, other types	7	6	Sandwiches, fresh	4	3
			Healthier food	3	2
Unhealthy items	**n**	**%**	**Unhealthy items**	**n**	**%**
Sweets/chocolate	61	52	Sweets/chocolate, other types	16	11
Carbonated cool drinks	32	28	Carbonated drinks, other types	6	4
Crisps	19	16	Crisps, other types	3	2
Ice cream	15	13	Ice cream, other types	6	4
Pizza	15	13	Pizza	6	4
Vetkoek*	12	10	Vetkoek[#]	3	2
Cake, biscuits, dounuts	15	14	Cake	3	2
French fries	10	9	French fries	8	6
Restaurant/take away food	6	5	Restaurant/take away food	7	5
Lasagna/Pasta	3	3	Lasagna/Pasta	6	4
Pies	3	3	Pies, other types	6	4
Meat	11	10	Meat	8	6
Cordial	3	3	Cordial, other types	3	2
Milo	3	3	Milo, hot	3	2
Milkshakes	2	2	Milkshake	3	2
Biltong& dry wors	13	12	Flavoured milk	6	4
Energade/Powerade	2	2	Flavoured water	4	3
Sea food	3	3			
Milk iced lollie	3	3			
Burgers	2	2			
Croissant	2	2			

* School A = nutritionally-regulated tuck shop;** School B = conventional tuck shop; #Vetkoek = dough deep fried in oil

3.7 THE AMOUNT OF MONEY PRIMARY SCHOOL LEARNERS HAVE AVAILABLE TO SPEND AT THE TUCK SHOP

Learners in both schools indicated that they get an amount of "R100 or more" pocket money per month. Learners in school A spent "between R6 and R10" at the nutritionally-regulated tuck shop per visit, while learners in school B spent "between R11 and R20" per visit to the conventional tuck shop (Table 3.34).

Table 3.34: The amount of pocket money grade 2 to 7 learners receive and amount they spent at the tuck shop per visit

School	n	Pocket Money	Spent at tuck shop
A*	116	R100 or more	Between R6 and R10
B**	141	R100 or more	Between R11 and R20

* School A = nutritionally-regulated tuck shop;** School B = conventional tuck shop

3.8 NUTRITIONAL ANALYSIS OF FOOD ITEMS IN THE CONVENTIONAL TUCK SHOP AND THE NUTRITIONALLY-REGULATED TUCK SHOP

In this section the nature of each tuck shop is first discussed, where after comparisons are made between the nutritional analysis of the types of food items available in the conventional tuck shop and nutritionally-regulated tuck shop and the chosen terminology for each tuck shop is substantiated.

3.8.1 Tuck shop at school A (nutritionally-regulated tuck shop)

The tuck shop at school A offered a variety of unsweetened fruit juices, homemade ice tea, iced lollies (frozen diluted fruit juice), water and the slushy (drink made with crushed ice and fruit juice). No carbonated cool drinks or sports drinks were sold. The snack items included low GI pancakes, muffins[α], brownies[α], fresh fruit, dried fruit, peanuts and raisins, sucrose free candy and air-popped fat free popcorn. Commercial Jungle energy bars were also sold

[α] These items are regarded as healthy items since recipes were adapted to have a lower fat and sugar content

after parents complained that their children could not buy anything from the tuck shop to eat while doing sports. The menu for foods items differed from day to day and included hamburgers, chicken sandwiches, samoosas (also called meat pies by some learners) and the tuck shop manager decided to sell hot dogs with boerewors sausages once per week on a Friday to satisfy the parents who were complaining about the type and variety of items offered at the tuck shop. Recipes of all items sold in this tuck shop were adjusted by the

school's tuck shop manager (who had no qualifications in the field of nutrition) to include less fat, less sugar and more fibre.

3.8.2 Tuck shop at school B (conventional tuck shop)

At school B it was found that learners could choose from an assortment of beverages such as carbonated cool drinks, cordials, sports drinks, unflavoured water, fruit juice, drinking yoghurt, flavoured milk, Milo and iced lollies. Snacks such as crisps, sweets, chocolates, biltong, baked goods (cupcakes, muffins, biscuits, doughnuts, and tarts), yoghurt, peanuts and fruit (only 1 banana and 1 peach) were available.

Most of the food items were available on a daily basis, including a variety of pies, beef burgers, chicken burgers, chicken mayonnaise filled pita breads, hot dogs and toasted sandwiches filled with polony (processed meat) and cheese (called "ham and cheese"). The tuck shop manager at school B was aware that he was selling popular items, with long shelf lives that brought in the most profit. In an effort to control the types of items sold, the school governing body requested that only healthier items should be available in the mornings, while all other items could be sold from break time. The owner thus selected the following items, all perceived to be healthier options, to be sold in the mornings: Biltong (salted, dried meat), muffins, cup cakes, mini pies, Tinkies (commercially packaged sponge cake with filling), Jungle energy bars, yoghurt, rusks, peanuts, a package containing a sandwich and a fruit, water, Energade and Powerade sports drinks, sweetened milk, fruit juices and cordial.

3.8.3 Comparison between the tuck shops

The nutritional content of all the beverages, food and snack items that were available in the tuck shop of school A and B on the day of data collection is presented in Appendix L. The tuck shops in school A and B were very different with regards to the types of items sold and the nutritional content of these items. It is also interesting to note that the tuck shop in school B offered a larger variety of items. Table 3.35 illustrates a comparison of the nutritional content of the most popular items that were available in the two school tuck shops during the survey.

Beverages available for purchase at school B contained more energy and carbohydrates, while the snacks and food items were much higher in energy and fat content than the items available for purchase at school A (Popular food and snacks: 1264 - 2854.3kJ per serving, 14.9 - 49.8g fat per serving; popular beverages: 477 - 600kJ per serving, 29 - 36.3g carbohydrates, as sugar per serving) (Table 3.35). Hence the decision was made to refer to this tuck shop as a conventional tuck shop, because the items chosen for sale were based on popularity and increasing profits.

The items sold at the tuck shop in school A were selected and recipes adapted by the tuck shop manager to provide less sugar, fat and energy (Popular food and snacks: 276.9 - 736.6kJ, 2 - 3.7g fat; popular beverages: 194 - 442kJ, 11.1 - 25.4g carbohydrates, as sugar). A constant effort was also made to include more fruit and vegetables in food and baked goods, thus the tuck shop is referred to as a nutritionally-regulated tuck shop.

Table 3.35: Comparison of the most popular beverages, food and snack items in the nutritionally-regulated tuck shop and conventional tuck shop

School A*					School B**				
Beverages					**Beverages**				
	Energy (kJ)	**Carbo-hyrates (g)**	**Protein (g)**	**Fat (g)**		**Energy (kJ)**	**Carbo-hydrates (g)**	**Protein (g)**	**Fat (g)**
Slushy	194	11.1	0.08	0	Coke	594	36.3	0	0
Iced lollie	93.2	5.3	0.04	0	Iced lollie	160	9.7	0	0
Juice Tropical blend	228	13.4	0	0	Cordial Oros	477	29.37	0.002	<0.03
Juice Ceres	422	25.4	0.2	0	Energade	600	35	0	0
Water, unflavoured	0	0	0	0	Water, unflavoured	0	0	0	0
Snacks and Food					**Snacks and Food**				
Sweets	87.3	9	0	0	Jelly sweets	332	19.5	1.4	0
Chocolate muffin	559.4	23.5	3.5	2.8	Chocolate	1007	36.7	2.4	10.9
Popcorn	375.8	11.2	1.9	4.1	Simba Crisps	784	16	2.7	12.6
Pancake	546.5	20	4.5	3.5	Hotdog	1264	34.9	7.1	14.9
Samoosa	276.9	6.4	5.5	2	Pie	2854.3	28.9	30.6	49.8
Chicken sandwich (sold as a half portion)	712.6	23.9	10.4	3.4	Toasted sandwich ("ham &cheese")	1291.7	33	9.7	15.3
Hamburger	763.6	26.2	10.2	3.7	Chicken mayo Pita	2036.6	45.1	20.3	25

* School A = nutritionally-regulated tuck shop;**School B = conventional tuck shop

3.9 CONCLUDING STATEMENT ON RESULTS

In this chapter the results from the questionnaire, focus group discussions and the nutritional analysis of two tuck shops collected from two Afrikaans medium, co-education primary schools in Bloemfontein were presented. Quantitative and qualitative results were interpreted in an integrated way, according to the mixed method approach with a triangulation type design which was employed for this study. Significant differences were found in several instances and valuable information was revealed. The implications of the results are discussed in more detail in chapter 4.

CHAPTER 4: DISCUSSION OF FINDINGS

4.1 INTRODUCTION

In this chapter the results of the study are discussed where after the stated hypotheses (2.2.3) are either accepted or rejected.

4.2 DISCUSSION OF THE RESEARCH OBJECTIVES

Objectives directly focused on aspects related to the perceptions, attitudes and behaviour of the sample of learners from two primary schools in Bloemfontein with nutritionally different tuck shops, while one objective was directed to a nutritional analysis of the food and beverage items in the respective tuck shops at the two schools. The last objective that aimed to formulate recommendations for the extension of the nutritionally-regulated tuck shop to other schools, based on the study outcomes, is discussed in the final chapter.

4.2.1 Objective: To determine if primary school learners' perceptions, attitudes and behaviour towards healthy eating differ between a school with a nutritionally-regulated tuck shop and a school with a conventional tuck shop

Perceptions about breakfast

With regards to perceptions about breakfast, the only significant difference found was that more grade 3's in the school with a conventional tuck shop agreed with the statement "Children who eat breakfast are clever", compared to grade 3's in a school with a nutritionally-regulated tuck shop, but no differences were found between the views of the respective groups of grade 3 learners in the focus groups about eating breakfast. The difference can possibly be explained in terms of the relatively young age of learners in grade 3 when perceptions can fluctuate very easily and can be influenced by the various personal, socio-environmental and behavioural factors that influence learners' dietary behaviour and nutrition related perceptions.[15,23-27] The absence or presence of a tuck shop with healthier items, is a possible socio-environmental factor that influenced the perceptions of the specific

grade 3 group. The evidence is, however not convincing enough to come to such a conclusion.

Perceptions about sweets

Significantly more grade 7's in a school with a nutritionally-regulated tuck shop agreed that sweet things can make them fat. Contrary to this finding, a difference, although not significant found between the grade 7 groups, were that the entire grade 7 group in the school with the conventional tuck shop thought they should first eat healthy foods before having sweets compared to less than a third of the grade 7's in the school with the nutritionally-regulated tuck shop who had this perception.

A significant difference was found between the girls in the two schools where more of the girls in the school with the conventional tuck shop agreed that they should first eat healthy food before having sweets compared to the girls in the school with the nutritionally-regulated tuck shop. A possible explanation for the significant difference between the two groups of girls in the context of this study, might be that girls in the school with the conventional tuck shop were very aware that their tuck shop did not provide in the "must first eat healthy food" - as in the given statement, and with girls often being more sensitive about the effect of "eating right" on their appearance, the girls in this school might have become more conscious of the limited healthy food choices in their conventional tuck shop. A study by Lai Yeung (2010) reports that female adolescents attending schools in Hong Kong were more conscious of their weight and were willing to change their food consumption to maintain or attain the desired body image.[69]

Perceptions about fat

During the discussions, all the learners in the focus groups in both schools held the view that the consumption of unhealthy food, and specifically fatty foods, should be limited. Despite the similar views among learners, some differences were found between the two schools

when perceptions about specific healthy and unhealthy foods were tested by taking part in an activity during the discussions. All learners in a school with a nutritionally-regulated tuck shop perceived peanut butter as healthy and older learners (grade 4 to 7) perceived white bread as unhealthy, while only the grade 3's in this school perceived polony as unhealthy. Learners in the school with the conventional tuck shop mostly perceived white bread and polony as healthy and all groups perceived crisps and potato chips as unhealthy. This may give an indication that older learners in the school with the nutritionally-regulated tuck shop had a greater awareness of the nutritional quality of some foods, while the younger group in this school (in this case the grade 3's) and several groups in the school with the conventional tuck shop, had difficulty classifying high fat items such as polony, pies, peanuts and peanut butter. These results may indicate that some groups in this study population lack knowledge about the nutritional quality of certain food items. Nutritional knowledge is one of the factors that influence nutritional perceptions and health related behaviour.[26,27] There might therefore be a need for interventions at these schools to promote greater awareness of the nutritional quality of specific food items.

Perceptions about the school tuck shop

Differences in perceptions towards the two schools' tuck shops were detected during the focus group discussions. The learners in the school with the nutritionally-regulated tuck shop were very aware of the "healthy" nature of their tuck shop, and not everyone liked the idea. This may be attributed to eating habits and related perceptions already formed at home or school. Only the younger learners in the school with a nutritionally-regulated tuck shop thought that other schools should also have a "healthy" tuck shop, while the older ones said that they "don't want to put them (other learners) through it". The perceptions of some of the older learners in the school with the nutritionally-regulated tuck shop showed that they were opposed to the idea of having a nutritionally-regulated tuck shop without any unhealthy food items. Contrary to the feelings of the learners in the school with the nutritionally-regulated tuck shop, the learners in the school with the conventional tuck shop thought that other schools should have the same type of tuck shop as theirs. Reasons given

are that it is a “privilege” and then they can “get what they want”. Other reasons included that their tuck shop “is just right” and because “it sells nice stuff”. Once again one becomes aware of the possible influence of socio-environmental factors, such as food availability, peers and the school environment that can influence learners’ nutrition related perceptions.

Perceptions related to the tuck shop with regards to what other learners think of the school’s tuck shop, also differed between the two schools. During the focus group discussions it was found that the majority of the learners were negative towards their nutritionally-regulated tuck shop and perceived it as "too healthy" and also "they don't like it at all", "they feel sorry for us", "people think we try to get attention by having a healthy tuck shop"; while learners in the school with the conventional tuck shop perceived that others liked their tuck shop, think it's "cool", but "just a bit expensive". These differences can be explained by the different natures of the tuck shops and how learners perceived these tuck shops. The negative perceptions of the learners in the school with the nutritionally-regulated tuck shop might give an indication of what can happen if a tuck shop is made to be too radically different from the usual conventional school tuck shop – instead of achieving the desired positive perceptions, attitudes and behaviour towards healthy eating, the opposite might be accomplished when learners start showing negative perceptions and attitudes towards healthy behaviour such as having a “healthy tuck shop”, as found in this study. Another reason for the negative perceptions might also be that learners felt that they did not have a say about having a nutritionally-regulated tuck shop. Some researchers report that school-based interventions were more successful when they involved the learners in important decision making processes and allowed them to share their views.[33,100-102] A partnership with school learners during the planning phase for school-based nutrition interventions might thus help to achieve successful outcomes.

During the focus group discussions it became clear that the majority of the learners in both schools preferred a combination of both healthy and unhealthy items to be available in their respective tuck shops. It is interesting to note that despite the respective exposure to two different kinds of tuck shops, learners in both schools had very similar perceptions about what tuck shops should sell. It was also detected that learners wanted to be able to exercise

control over the type of food they select. In a study by Lai Yeung (2010), the majority of adolescents attending schools in Hong Kong wanted the school snack bar to sell unhealthy food items.[69] On the other hand, Gosliner *et al.* (2011) found that adolescents in the USA wanted to be able to buy fresh fruit and vegetables at school, but although learners wanted the healthy options to be available, their overall consumption of fruits and vegetables at school was very low.[33] In the same vein, Downs *et al*. (2012) report that many school learners prefer to eat healthy food, but barriers such as the availability of only unhealthy food items prevent them from making healthier food choices.[103] It can thus be gathered from the findings in this study and confirmed by other studies that many learners want to be able to have a choice between healthy and unhealthy items at school tuck shops. However, it is questionable whether learners would have the means to choose healthy items over popular, unhealthy items if they are offered such a variety.

Attitude towards the tuck shop

In line with the perceptions already discussed in a previous paragraph, most of the learners were very positive towards their conventional tuck shop. During the focus group discussions they indicated that they "like the food" and "the people are friendly", only a few indicated that they would also like to be able to buy healthy items from their tuck shop because “they sell things we may not eat”, while some of the older learners mentioned that they did not like the prices (“expensive”). At the school with the nutritionally-regulated tuck shop, the younger learners were positive toward the tuck shop, while the older learners were not as positive. Some of the older learners wanted to be able to choose from a variety of healthy and unhealthy items in the tuck shop, while others wanted the "old" conventional tuck shop back. Learners’ responses to the question “The tuck shop must not sell sweets and cool drinks” confirmed the negative attitudes of the older learners (grade 5 to 7) towards the nutritionally-regulated tuck shop. A possible reason why younger learners were more accommodating towards the nutritionally-regulated tuck shop may be because they had never been exposed to the conventional tuck shop that the school used to have. The nutritionally-regulated tuck shop in the study had only been operational for two years at the

time of the study, it would therefore be interesting to repeat a study like this after a couple of years to determine the longitudinal effect of the presence of a nutritionally-regulated shop at a school on learners' perceptions, attitudes, behaviour towards healthy eating. Another explanation for the difference in attitude found between the younger and older learners in the school with the nutritionally-regulated tuck shop might be linked to the younger and older learners' different developmental periods in their respective lives. Freeley *et al.* (2012) studied the dietary habits and eating practices of South African adolescents in urban areas of Soweto and Johannesburg and found that dietary patterns of children were established by the age of 13 years.[57] The perceptions, attitudes and behaviours of the younger learners in this study were probably still influenced by the various socio-environmental, personal and behavioural factors, while the older learners have already formed their own belief and value system, while still being conscious of socio-environmental factors such as peer pressure.[15,21-28] This emphasises the importance of the recommendations of the WHO stating that early interventions are needed to target children while their food habits are still developing.[6,7,10]

A significant difference was found between the grade 4 learners in the two schools. More grade 4's in the school with the nutritionally-regulated tuck shop agreed with the statement, "The tuck shop must not sell sweets and cool drinks", compared to grade 4's in the school with the conventional tuck shop. In the focus group discussion with the grade 4's in the school with the nutritionally-regulated tuck shop, there were some feelings that there should be restrictions on the types of items that tuck shops sell, for example "only unhealthy on Fridays", "it is actually better if it is healthy, otherwise it makes you fat", while grade 4 learners in the school with the conventional tuck shop agreed that tuck shops should sell both healthy and unhealthy items. This might be an indication that some learners were already more open towards the nutritionally-regulated tuck shop concept than those learners who were only exposed to a conventional tuck shop at their school.

Attitude towards fruit and vegetables

Several significant differences were found between learners in the two school with regards to their perceptions towards certain fruit and vegetables. Learners in the school with a nutritionally-regulated tuck shop liked certain vitamin C-rich fruits (watermelon, melon, guava, nartjie, mango), figs, some types of green vegetables (lettuce, cucumber, spinach, broccoli, peas) and other vegetables (carrots, sweet peppers, cauliflower and mushrooms) significantly more than the learners in a school with a conventional tuck shop. Some of these fruits and vegetables e.g. watermelon, citrus fruit, lettuce, cucumber, carrots, sweet peppers and mushrooms were sold in the tuck shop and included in recipes and thus could have influenced learners' attitude towards these fruits and vegetables. It seems as if the attitudes of learners in a school with a nutritionally regulated tuck shop, where learners are exposed to a variety of fruit and vegetables on a daily basis, had thus been influenced positively towards certain types of fruits and vegetables when compared to learners in a school with a conventional tuck shop.

General health behaviour

The focus group discussions showed that learners' health behaviour with regards to the number of times per day they ate and the types of food they ate for breakfast, did not differ between the schools. Some differences in learners' behaviour were detected in the focus group discussions when learners in four of the groups (grades 2 to 6) in the school with the nutritionally-regulated tuck shop mentioned fruit as a favourite food, while only two groups (grades 4 and 6) in the school with the conventional tuck shop mentioned fruit as a favourite food. Furthermore, learners in the grade 3 to 7 focus groups in the school with the nutritionally-regulated tuck shop also mentioned that fruit was one of their favourite items to buy from the tuck shop, while none of learners in the focus groups in the school with the conventional tuck shop mentioned that they bought fruit from their tuck shop. It therefore seems, once again, that the health behaviour of the learners was positively influenced by the presence of the nutritionally-regulated tuck shop. But when given a choice between fruit and

sweets, significantly more learners in the school with the nutritionally-regulated tuck shop chose sweets for their lunchboxes compared to learners who had a conventional tuck shop at their school. A possible explanation for this very interesting (and almost contradictory finding) might be that learners in a school with a nutritionally-regulated tuck shop had made a habit of taking sweets to school in their lunchboxes because they cannot buy sweets at their school's tuck shop.

Other significant differences were also found between the various groups of learners in the two schools' behaviour. In the school with the nutritionally-regulated tuck shop more grade 7's chose carbonated cool drink and more grade 5's chose the pie for their lunch box compared to the grade 7 and 5 learners respectively, in the school with the conventional tuck shop. The perceptions and attitudes of the grade 5 and 7 focus groups indicate that they were not positively inclined towards their nutritionally-regulated tuck shop and they admitted that they "are not used to" the tuck shop, it is "too health conscious" and they "eat enough healthy food at home" and that learners in other schools thought that it is "not a nice tuck shop" and "feel sorry for us". A study by Velazquez *et al.* (2011) found that the perceptions of adolescents are associated with their dietary behaviours, which could explain why the health behaviour of the grade 5's and 7's in the school with the nutritionally-regulated tuck shop was not positively influenced to make healthier food choices.[104] It is not clear why the grade 6 learners did not present with the same health behaviour as the grade 5 and 7 groups.

A difference was also found between the grade 4 groups when none of the learners in grade 4 in the school with the nutritionally-regulated tuck shop chose milk for their lunchboxes. The reason for this behaviour could be related to the fact that they mentioned in the focus group discussion that they did not like to drink plain milk.

In summary the learners with the nutritionally-regulated tuck shop did not always display positive perceptions, attitudes and behaviours towards healthy eating when compared to learners in a school with a conventional tuck shop, as was stated in the hypothesis for the study.

4.2.2 Objective: To determine if primary school learners' perceptions, attitudes and behaviour towards healthy eating differ across different year groups and between genders

Perceptions of different year groups and genders

Some differences in perceptions were found between the younger and older learners. In the school with the nutritionally-regulated tuck shop most of the grade 7's did not think they should eat healthy food before having sweets compared to the other age groups. In both schools all of the grade 2 and 3 learners agreed that they must first eat healthy food before having sweets.

In both schools the younger learners (grade 2 to 4) misunderstood the question about "food that makes you hands oily". Only the older learners (grade 5 to 7) could relate oily hands to food that contains fat and here it was seen that the older learners' perceptions showed more insight and had more informed views about fat. A significant difference between the age groups in the school with the conventional tuck shop showed that more grade 5 and 7 learners in this school viewed fatty food as unhealthy. Despite the educated views of older learners only a third of the grade 6 and 7 learners in the school with the conventional tuck shop thought that the intake of oily foods should be limited. No differences between boys and girls with regards to their perceptions towards fat were found.

In the school with the nutritionally-regulated tuck shop, the opinions and perceptions of the younger and older learners differed with regards to the schools' tuck shops. The younger learners, especially in grades 2 and 3 were very positive towards the tuck shop and thought that other schools should also have the same type of tuck shop, while the older learners had negative perceptions towards the tuck shop and felt that there was "no need" for other schools to also have a nutritionally-regulated tuck shop. As discussed earlier, the younger learners were never exposed to the conventional tuck shop that the school used to have and this might be the reason why they were more accepting towards the concept of a nutritionally-regulated tuck shop.

Nutrition topics such as healthy eating are included in the Life skills subject of the Free State province's school curriculum until grade 5, where after the curriculum focuses more on food

hygiene, substance abuse and management of diseases/conditions such as Tuberculosis, Diabetes Mellitus, anorexia and obesity in grades 6 and 7.[105] This might be an indication that nutritional knowledge on its own is not sufficient to influence health behaviour, especially in older learners who are entering the phase of adolescents where they have already formed their own believe system and have established eating habits.[57]

Attitudes of different year groups and genders

Similar to their perceptions, the attitudes of younger learners towards their nutritionally-regulated tuck shop were also more positive than those of the older learners. In both schools the grade 2 and 3 learners thought that a tuck shop must not sell unhealthy items, in contrast to the older learners who either disagreed or were unsure. This is in contrast to a trend of several significant differences which showed that grade 2's in both schools had negative attitudes towards certain fruits and vegetables.

In grade 6, boys liked the nutritionally-regulated tuck shop much more than the girls. The negative attitudes of the girls might have been influenced by several factors such as peer pressure, food preferences and personal experiences. Another difference between genders was that girls, in both schools liked certain fruits and vegetables significantly more than boys. A study by Sandvik *et al.* (2005) also reports that girls (11 – 12 years old) were more positive towards fruits and vegetables than boys.[106]

Behaviours of different year groups and genders

The behaviour of some of the younger learners, in both schools, showed that there were extreme cases where the learners ate several meals per day ("six times because I am very hungry", "only six times per day", "whenever I want to") or just "once per day", whereas the older learners ate three to four times per day. Although it is not possible to say with certainty, some of these comments may be linked to a lack of discipline when it comes to healthy eating behaviours among a smaller group of these primary school learners.

Some girls in grades 2 and 7 in the school with the conventional tuck shop did not eat breakfast everyday like the rest of the learners in the other age groups. It is not clear why the behaviour of skipping breakfast was only found in some girls and not with boys, because girls usually have healthier eating habits than boys.[59]

A difference in behaviour was found when learners in the focus groups discussed which breakfast cereals they eat. Only the younger learners (grades 2 to 4 in the school with the nutritionally-regulated tuck shop and grades 2 to 5 in the school with the conventional tuck shop) mentioned chocolate coated cereals as a breakfast option. In a study by Meininger *et al.* (2010) learners of all ages liked sweet foods and the researchers also found that the young learners thought cereals were good for them and also linked "food that tastes good" to "food that is good for you".[107] The media can play a role in influencing learners' eating behaviour, since marketing strategies target young children by promoting the sale of energy-dense items that are high in fat and sugar, such as refined breakfast cereals.[23,34,35] In South Africa, advertisements such as the adverts for Coco Pops and Milo chocolate breakfast cereals target children by giving the impression that eating these cereals are "healthy" and "cool". This might explain why so many of the younger learners enjoy eating chocolate coated cereals. Another explanation could be poor parental practices which have a negative impact on children's behaviour, such as using food as a reward or feeding for emotion regulating because children manipulate them.[37]

Another difference between the year groups, was that the oldest learners (grade 7 in both schools) did not mention fruit as a favourite food item, while the youngest learners (grade 2's) in the school with the nutritionally regulated tuck shop was the only group in this school that did not mention that they bought fruit from the nutritionally-regulated tuck shop. Research shows that there are several barriers that prevent learners from consuming fruits and vegetables such as availability, taste, peer pressure, social norms and parental behaviour.[27,100,106]

Significant differences between the age groups were also found when learners had to choose items for their lunchboxes. The grade 5's in the school with the nutritionally-regulated tuck shop chose the least amount of fruit for their lunchboxes, while most of the

grade 6 and 7 learners in the school with the conventional tuck shop chose a sandwich for their lunchbox instead of a pie. In terms of lunchbox contents the grade 7 learners in the school with the conventional tuck shop show positive health behaviour by bringing more water to school compared to the other grades in this school. It can therefore be seen that in some instances the health behaviour of certain year groups were influenced more positively than others.

Gender differences were also found when learners had to select items for their lunchboxes. Significantly more girls in school B chose juice while significantly more boys in the same school chose carbonate cooldrink. In school A significantly more boys compared to girls chose milk for their lunchboxes. An indication of the hypothesised outcomes stating that girls have more positive health behaviours than boys were thus more evident in the school with the conventional tuck shop.

In summary the younger learners and girls did not always display positive perceptions, attitudes and behaviours towards healthy eating when compared to older learners and boys, as was stated in the hypothesis for the study.

4.2.3 Objective: To establish what primary school learners bring to school in their lunchboxes and compare the nutritional adequacy thereof between a school with a nutritionally-regulated tuck shop and a school with a conventional tuck shop

It was found that most learners in this primary school setting brought a lunchbox to school on a daily basis. A study in South Africa, conducted in secondary schools, found that only about 50% of adolescents took a lunchbox to school.[2] The habit of taking a lunchbox to school should be reinforced in an attempt for this behaviour to remain throughout the school career. Schools should thus collaborate with parents because their involement in health promotion play an important role in the development of their children's dietary behaviour and perceptions.[24,25]

The majority of learners had a sandwich in their lunchbox of which most had a white bread sandwich. Fillings with a high fat content such as peanut butter, cheese and meat fillings

were popular in both schools. Learners in a school with a nutritionally-regulated tuck shop had significantly more fruit, muffins and water in their lunchboxes and interestingly, also significantly more unhealthy items such as sweets and crisps. During the focus group discussions, most of the groups in the school with the nutritionally-regulated tuck shop mentioned fruit as one of their favourite lunchbox items compared to only a few groups from the school with the conventional tuck shop who mentioned fruit.

Thus, on the one hand the presence of the nutritionally-regulated tuck shop influenced the behaviour of learners positively, because they brought more healthy items to school in their lunchboxes but, on the one hand, they also brought more unhealthy items from home probably because they could not buy it at school.

Findings by other researchers show that high fat lunchbox items, such as high fat spreads, snack foods and sweets in lunchboxes is a global problem.[2,14,54] Conway *et al.* (2002) studied the lunchbox contents of middle school learners in the USA and found that the majority of lunchboxes contained sandwiches of which most had high fat ingredients such as meat, cheese, peanut butter or mayonnaise. The researchers also reported that almost half of the sample brought fruit to school, but in addition to this, lunchboxes also contained chips, snack foods and cookies.[14] Sangiorski *et al.* (2005) reviewed the lunchbox contents in Australian primary schools. The typical lunchbox consisted of a sandwich, two biscuits, a piece of fruit, a snack (muesli/fruit bar/packaged snack) and a drink (fruit juice/cordial or water).[54] In South Africa, Temple *et al*. (2006) studied the food consumed by adolescents attending schools in Cape Town and found that the unhealthy food items brought to school from home outnumbered the healthy items by a ratio of 2:1, with white bread, sweets, chocolates and crisps being the most popular.[2] The behaviour regarding lunchbox contents as determined in this study, to a large extent confirms the findings of global and other South African studies.

4.2.4 Objective: To establish what items primary school learners buy at the tuck shop?

Learners at the school with the conventional tuck shop bought carbonated cool drinks, iced lollies, water, cordials, sports drink, sweets, crisps, pies, hot dogs, toasted sandwiches and filled pitas from their tuck shop. While learners at the school with the nutritionally-regulated tuck shop bought slushies, iced lollies, fruit juice, popcorn, muffins, sucrose free sweets, hamburgers, samoosas, pancakes and fruit from the tuck shop. The type and variety of tuck shop items that learners bought were thus influenced by the availability (Appendix L).

In South Africa, Wiles *et al.* (2011) and Temple *et al.* (2006) also studied the type of items that school learners bought from school tuck shops.[2,16] Temple *et al*. (2006) found that the majority of adolescents attending schools in Cape Town bought unhealthy items such as sweets, chocolate, soft drinks, French fries and potato chips from the schools' tuck shops- similarly as found for the school with the conventional tuck shop in this study.[2] As reported by Wiles *et al.* (2011) the most popular items sold in tuck shops in primary schools in Pietermaritzburg, South Africa, were savoury pies (similar to the school with the conventional tuck shop) and iced popsicles (as the slushies and iced lollies in this study). Only a few school tuck shops had bananas available and these sold the least number of units.[16] An observation that can therefore be made, based on this research study and supported by the study by Wiles *et al.* (2011), is that purchase is not only based on the availability of healthy items, but it is also influenced by the variety offered by the tuck shop, as well as the availability of other popular unhealthy items.

4.2.5 Objective: To determine how much money primary school learners have available to spend at the tuck shop

Learners in both schools indicated that they get "R100 or more" pocket money per month and learners in the school with the nutritionally-regulated tuck shop spent "between R6 and R10" per visit to the tuck shop, while learners in the school with the conventional tuck shop spent a bit more, "between R11 and R20", per visit to the tuck shop. Information regarding the cost of tuck shop items was not part of the data collection and thus it cannot be

explained why learners spent more money at the conventional tuck shop. It is recommended that future studies should also include the cost of each tuck shop items. These findings are very similar to primary school learners in Pietermaritzburg, South Africa that spent a mean amount of R7.09 at the first school break and R9.14 at the second school break.[16]

4.2.6 Objective: To compare the nutritional analysis of the types of food items available in the conventional tuck shop and the types of food items available in the nutritionally-regulated tuck shop

A large variety of beverages, snacks and food items was available for purchase at the conventional tuck shop. The most popular food items were the savoury pies, hot dogs, toasted ham and cheese sandwich, and chicken mayonnaise filled pita (1264 - 2854.3kJ, 14.9 - 49.8g fat per serving). Food or snacks items were sometimes bought in combination with popular beverages such as Coke, cordial or Energade sports drink (477 - 600kJ, 29 - 36.3g carbohydrates per serving). A small quantity of healthier items were also available, which included yoghurt, peanuts, fruit (only one banana and one peach on the days of data collection), water, flavoured milk and sweetened fruit juice, but from the results it is clear that these items were not popular for purchase.

A limited variety of healthier beverages, snacks and food items was available for purchase at the nutritionally-regulated tuck shop. The tuck shop manager made a constant effort to keep homemade items at a low GI, low in sugar, low in fat and high in fibre. The popular food items contained far less energy and fat than their unhealthy counterparts at the conventional tuck shop; these included a chicken sandwich – sold as a half portion, hamburger, “samoosa” and pancakes (276.9 - 736.6kJ, 2 - 3.7g fat). Beverages also contained less energy and carbohydrates than those at the conventional tuck shop: slushy and juice (194 - 442kJ, 11.1 - 25.4g carbohydrates).

It is thus clear that learners, who bought the popular items from the conventional tuck shop, as reported in the study, consumed more energy during school hours than learners who bought from the nutritionally-regulated tuck shop. These findings are supported by Wiles *et*

al. (2011) that reported that the average healthy snack consumed by primary school learners contained about half the kilojoules of the average unhealthy snack.[16]

4.3 HYPOTHESES OF THE STUDY

The hypothesis that "learners in a school with a nutritionally-regulated tuck shop have positive perceptions, attitudes and behaviour towards healthy eating when compared to learners in a school with a conventional tuck shop" is rejected. Although learners in the school with the nutritionally regulated tuck shop showed more positive health behaviours and positive attitudes towards healthy eating, the health-related perceptions of the learners in the two schools were very similar, except for the perceptions that the learners had toward their respective school's tuck shop.

Despite some differences between the year groups and between genders, the hypothesis that younger learners and girls have positive perceptions, attitudes and behaviour towards healthy eating when compared to older learners and boys, respectively cannot be accepted.

4.4 CONCLUDING STATEMENT ON DISCUSSION

In this chapter the quantitative and qualitative findings were discussed and results were compared between a school with a nutritionally-regulated tuck shop and a school with a conventional tuck shop. Interesting aspects of the perceptions, attitudes and behaviours of primary school learners in the selected study population have been detected, including a number of significant differences which were seemingly influenced by the availability of healthier food items in the nutritionally-regulated tuck shop. These findings constitute the core of the recommendations for the extension of the concept and practice of a tuck shop that is nutritionally-regulated to other schools, in order to advance healthy eating habits among school learners which are presented in the final chapter with the main conclusions of the study.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

In this chapter, key findings and conclusions of the study are summarised. This is followed by a consideration of the implications of the findings, acknowledgement of possible limitations of the study and a presentation of a set of recommendations for the extension of the concept and practice of a nutritionally-regulated tuck shop to other schools in order to advance healthy eating habits among learners. The chapter concludes with comments on the significance of the study.

5.1.1 Key findings from the literature review

The literature review showed that childhood overweight and obesity is a global phenomenon, which must be addressed at an early age. Several international and the few local South African studies that were available, reported that learners consume unhealthy food items at school and also bring more unhealthy items to school in their lunchboxes. In this research study the researcher thus aimed to contribute to the scarcity of data by identifying what the impact of a nutritionally-regulated tuck shop would be on perceptions, attitudes and behaviour of primary school learners from an urban area in Bloemfontein, Free State province, South Africa, towards healthy eating.

5.2 SUMMARY OF FINDINGS AND CONCLUSIONS

The questionnaire survey and focus group discussions aimed to answer the main research question of the study: What is the influence of a nutritionally-regulated tuck shop on Bloemfontein, Afrikaans medium, co-education primary school learners' perceptions, attitudes and behaviour towards healthy eating?

The presence of the nutritionally-regulated tuck shop influenced the perceptions and attitudes of learners towards the tuck shop itself. The younger learners were very positive and accepting towards their "healthy" tuck shop, while the older learners showed some resistance towards the concept of having a nutritionally-regulated tuck shop at their school.

Despite the negative perceptions and attitudes shown by some of the older learners, most learners indicated a preference for a balance between healthy and unhealthy foods to be made available in their school tuck shop. Learners even suggested that there should be some limitations on the selling of unhealthy items. These findings provided evidence that the presence of the nutritionally-regulated tuck shop did have an impact on the way learners in this school thought about healthy and unhealthy foods. Since the nutritionally-regulated tuck shop was only in operation for two years at the time of this study, the positive attitudes of the younger learners might be an indication that exposure to mostly healthy foods in the school environment can influence the perceptions, attitudes and behaviour of learners towards healthy eating from a young age.

Learners in the school with the nutritionally-regulated tuck shop showed positive attitudes towards certain vitamin C-rich fruits and some vegetables, including some types of green vegetables. This shows that a nutritionally-regulated tuck shop which offers a variety of fruit and vegetables (sold as fresh pieces of fruit and vegetables in addition to various other tuck shop items that contain fruit or vegetables), increase learners' exposure to fruit and vegetables and can ultimately influence their attitudes towards these types of food.

The nutritionally-regulated tuck shop offered the learners a variety of healthier items which were lower in energy, sugar and/or fat than conventional tuck shop items. Regardless of complaints and negative attitudes towards the tuck shop, several of the healthy items were bought by learners. The fact that learners bought these healthy items provided further evidence that the nutritionally-regulated tuck shop had a positive influence on learners' healthy eating behaviour. Unfortunately it was found that the nutritionally-regulated tuck shop was not as popular as a conventional tuck shop and learners spent less money per visit to the nutritionally-regulated tuck shop compared to learners who had access to a conventional tuck shop.

Fruit was found as one of the younger learners' favourite food items and their lunchboxes contained significantly more healthy items, such as fresh fruit, water and muffins, when compared to learners with a conventional tuck shop. In spite of certain positive influences of the nutritionally-regulated tuck shop on learners' behaviour, it also had a negative impact

since learners had fallen into the habit of bringing more sweets and chips in their lunchboxes because they could not buy these items at school.

Some significant differences between different year groups and gender were also found. The attitudes and perceptions of the younger learners were more positive towards the nutritionally-regulated tuck shop in school A and in both schools the grade 2 and 3 learners agreed that they must first eat healthy food before having sweets. But the younger learners (grade 2 to 4) were unsure about the nutritional quality of fats and oils and in both schools the grade 2 learners were less positive about many types of fruits and vegetables compared to the older learners. The oldest learners (grade 7 in both schools) did not mention fruit as a favourite food item, while the youngest learners (grade 2's) in the school with the nutritionally-regulated tuck shop was the only group in this school that did not mention that they bought fruit from the nutritionally-regulated tuck shop. In terms of lunchbox contents the grade 7 learners in the school with the conventional tuck shop showed positive health behaviour by bringing more water to school compared to the other grades in this school. Girls, in both schools liked certain fruits and vegetables significantly more than boys.

The three hypotheses for this study were tested and rejected.

5.3 IMPLICATIONS OF THE STUDY

The findings of the study hold important implications for school nutrition and in particular the regulation of the types of foods, snacks and beverages that are made available at tuck shops.

- The positive signs of the influence of a nutritionally-regulated tuck shop on learners' attitudes towards fruit and vegetables, as well as the healthy items that learners brought to school in their lunchboxes, gives an indication that there is value in regulating the types of foods, snacks and beverages made available for purchase during school hours.

- Younger learners were more positive towards the nutritionally-regulated tuck shop, but it can be expected that, with a longer period of exposure, the influence of the nutritionally-regulated tuck shop might become more visible in the attitudes of the older learners as well.
- The amount of money that learners have available to spent at the tuck shop can be used as a guideline when planning for the extension of the nutritionally-regulated tuck shop concept.
- The nutritional analysis showed that learners consumed healthier items from the nutritionally-regulated tuck shop; however, lunchbox contents and certain fixed eating behaviours can counteract the positive influences of the nutritionally-regulated tuck shop. A nutritionally-regulated tuck shop should ideally offer a variety of healthful, tasty foods, snacks and beverages items to choose from so that learners are not encouraged to bring sweets to school.
- In this study girls were more positive towards fruit, while boys in the nutritionally-regulated tuck shop liked raisins, thus boys might also like other types of dried fruit. Most learners liked milk, therefore low fat yoghurt drinks, frozen yoghurt and low fat milkshakes could be offered in a nutritionally-regulated tuck shop. Offering other items such as cereal bars (learners liked breakfast cereals), lean biltong (many learners liked meat) and low fat pasta (pastas were very popular) should also be considered.
- Learners, especially the older learners who are entering adolescents want to associate themselves with “cool” things, thus healthy eating habits and the purchase of healthy foods from school tuck shops must be marketed as being “cool” by making use of role models and marketing expert. This might encourage older learners to be more positive towards the nutritionally-regulated tuck shop concept.
- A school food policy which encourages learners to bring healthy lunchbox items to school may also help to regulate the types of food that are consumed during school hours.

- To improve the nutrition-related perceptions, attitudes and health behaviour of learners, the incorporation of effectively-planned nutrition education topics with the emphasis on healthy eating and living should be included in the school curriculum of all grades.
- The promotion of healthy eating habits at schools by means of a nutritionally-regulated tuck shop, may help to extend healthy eating habits of learners beyond the school environment and influence eating behaviour at home, since most of the focus groups in the school with the nutritionally-regulated tuck shop mentioned fruit as one of their favourite items to eat.

5.4 LIMITATIONS OF THE STUDY

The sample used for this study was relatively small (n=257) and only included well-resourced schools in an urban area with Afrikaans as the teaching medium. The results of the study can therefore not be extrapolated to South African learners who attend poorer resourced schools or schools in rural areas, learners of other culture groups or who does not attend Afrikaans-medium school. At the time of this research study, the nutritionally-regulated tuck shop was only in operation for two years; the exposure of the older learners and resulting impact in this school was therefore much less compared to older learners in the other school, who had been exposed to the conventional tuck shop for several years. It is also important to note that the older learners (grade 4 to 7) in school A were initially exposed to a conventional tuck shop and only recently to the nutritionally-regulated tuck shop, while the grade 2 and 3 learners only knew the nutritionally-regulated tuck shop. The autonomy of the older learners and their transition into the adolescence phase could also have had an impact on the older learners' perceptions, attitudes and behaviour towards healthy eating.

5.5 RECOMMENDATIONS

In this section, recommendations for the extension of the nutritionally-regulated tuck shop concept based on the study outcomes, are presented. Recommendations for dissemination and application and recommendations for further research, are also presented.

5.5.1 Recommendations for the extension of the concept and practice of a nutritionally-regulated tuck shop, based on study outcomes to other schools in order to advance healthy eating habits among school learners

The school environment can be used for health promotion since it provides access to numerous learners who spend a significant amount of time in the school environment.[10-13,15,27,40] Education and learning is the norm and in order to support health promotion school personnel, families and community members can be involved.[3,4,47] Based on the study outcomes, the following recommendations are made for the extension of the concept and practice of the nutritionally-regulated tuck shop in order to advance healthy eating habits among school learners:

- Introduce the Health Promoting Schools initiative to schools as part of the Integrated School Health Programme in order to sensitise parents, learners, school personnel and the broader community about the holistic concept of "health". Existing frameworks and resources in the school setting should also be used to the advantage of promoting health, i.e. the main aim of the school setting is empowerment through dissemination of knowledge.[3,47]
- Involve and educate parents in order to gain their support, since they play a key role in influencing learners' nutrition-related perceptions and dietary behaviours.
- Consult with tuck shop managers and advise them about healthy food, snack and beverage options, in order to prevent tuck shop managers from selecting tuck shop items based on their own perceptions of what is good and healthy for learners. In addition Wiles *et al.* (2011) recommend that tuck shop managers should also be

educated regarding the appropriate quality and quantity of ingredients used in the preparation of homemade tuck shop items, while Temple *et al.* (2006) suggest that the South African Food Based Dietary Guidelines (FBDG) can be used to guide tuck shop owners and to educate learners on healthy food choices.[2,16]

- Involve learners in the planning process of the nutritionally-regulated tuck shop. By getting their inputs and support and allowing them to voice their opinions, the nutritionally-regulated tuck shop concept might be more readily accepted.
- Limit access to unhealthy tuck shop items and increase the number and variety of healthy items in the school's tuck shop. To increase the sales of healthy tuck shop items Wiles *et al*. (2011) recommend that healthy items should be displayed better and marketed among school children.[16]
- Develop a school food policy according to Health Promoting Schools principles to be implemented in schools to support healthy eating.[3,56] A food policy should stipulate which items are not suitable for consumption during school hours. In a democratic country, such as South Africa, such a policy cannot be forced onto learners, but should rather be used as a guideline to encourage learners to bring healthy food to school in their lunchboxes.
- Schools can obtain the assistance of external stakeholders' tuck shop intervention programmes to promote healthy foods in schools.[44,50-53]
- Vegetable gardens at schools can promote the intake of vegetables and encourage children to taste vegetables.[45,56] Schools should contact the South African Department of Agriculture to help plant and maintain school vegetable gardens.[44,50]

Various strategies can thus be implemented for nutrition interventions at schools and these guidelines offer possibilities to counteract the development of overweight and obesity in school learners and can also be important in the South African school context.[2]

5.5.2 Dissemination and application

The findings of this study need to be shared with other dietetic professionals and school authorities by means of publication of the results in peer reviewed literature, presentations to relevant stakeholders and other forums. A report on the findings of the study will be submitted to the Free State Department of Education and the participating schools.

5.5.3 Further research

The researcher suggests that research in the field of school nutrition in South Africa should be continued in order to obtain data from larger samples of learners to further explore the health and nutrition related perceptions, attitudes and behaviours of South African school learners. Target groups should include different populations groups and groups of different socio-economic status and age living in urban as well as rural areas. There is also a need for the development of standardised questionnaires which can be used to test school learners' health related perceptions, attitudes and behaviours. Some interesting research questions, which surfaced during the course of this study, can be explored in depth in further research. These are:

- To what extent can South African primary school learners make good food choices when they must choose from a variety of healthy and unhealthy items offered at a school tuck shop?
- Do learners in a school with a nutritionally-regulated tuck shop eat healthy food at home?
- Is there a difference in the body mass index of learners in a school with a nutritionally-regulated tuck shop compared learners in a school with a conventional tuck shop?
- Is there a direct relationship between childhood obesity and unhealthy foods eaten during school hours, in the South African context?

- What are the perceptions, attitudes and behaviour of secondary school learners in South Africa towards healthy eating?
- What are the average energy, protein, carbohydrates and fat contents of the food items in South African primary school learners' lunchboxes?
- What is the difference between the micronutrient intakes of learners in a school with a nutritionally-regulated tuck shop and learners in a school with a conventional tuck shop?

5.6 SIGNIFICANCE OF THE RESEARCH

The findings of this study can make a contribution to the field of Nutrition and Dietetics, where there is currently limited research in the field of school nutrition and the regulation of foods and beverages consumed during school hours. New perspectives were gained and some hypotheses for further research were generated. The results add to our current knowledge of learners' attitudes, perceptions and behaviour towards healthy eating and show how manipulation of the school environment, by means of controlling the types of food items and beverages that are sold by the tuck shop, may influence learners' attitudes, perceptions and behaviours towards healthy eating. The participating schools, as well as other schools, can also benefit from the findings and can adapt the school environment according to the recommendations. In this way they can provide the best possible environment to facilitate the development of healthy eating behaviours of learners and potentially prevent the development of childhood overweight and obesity and thus prevent NCDs.

On a personal level the researcher gained valuable experience and insight, which will be shared with other dietetic professionals and school authorities.

5.7 CONCLUSION

It can be concluded that the nutritionally-regulated tuck shop in a primary school in Bloemfontein influenced the perceptions, attitudes and behaviour of learners since they were more positive towards certain types of fruits and vegetables; they displayed healthy behaviours by buying from the nutritionally-regulated tuck shop and also by bringing more healthy items to school in their lunchboxes. An unforeseen influence that the nutritionally-regulated tuck shop had on learners' behaviour, was that they also brought more unhealthy items to school in their lunchboxes since they could not buy these items from the nutritionally-regulated tuck shop and older learners were negative towards the nutritionally-regulated tuck shop and preferred the conventional tuck shop that the used to have. A nutritionally-regulated tuck shop can thus have a positive influence on certain attitudes and behaviours of learers, but other factors, such as previous exposure to a conventional tuck shop, lunchbox contents and fixed eating behaviours, may counteract the positive influence of the nutritionally-regulated tuck shop.

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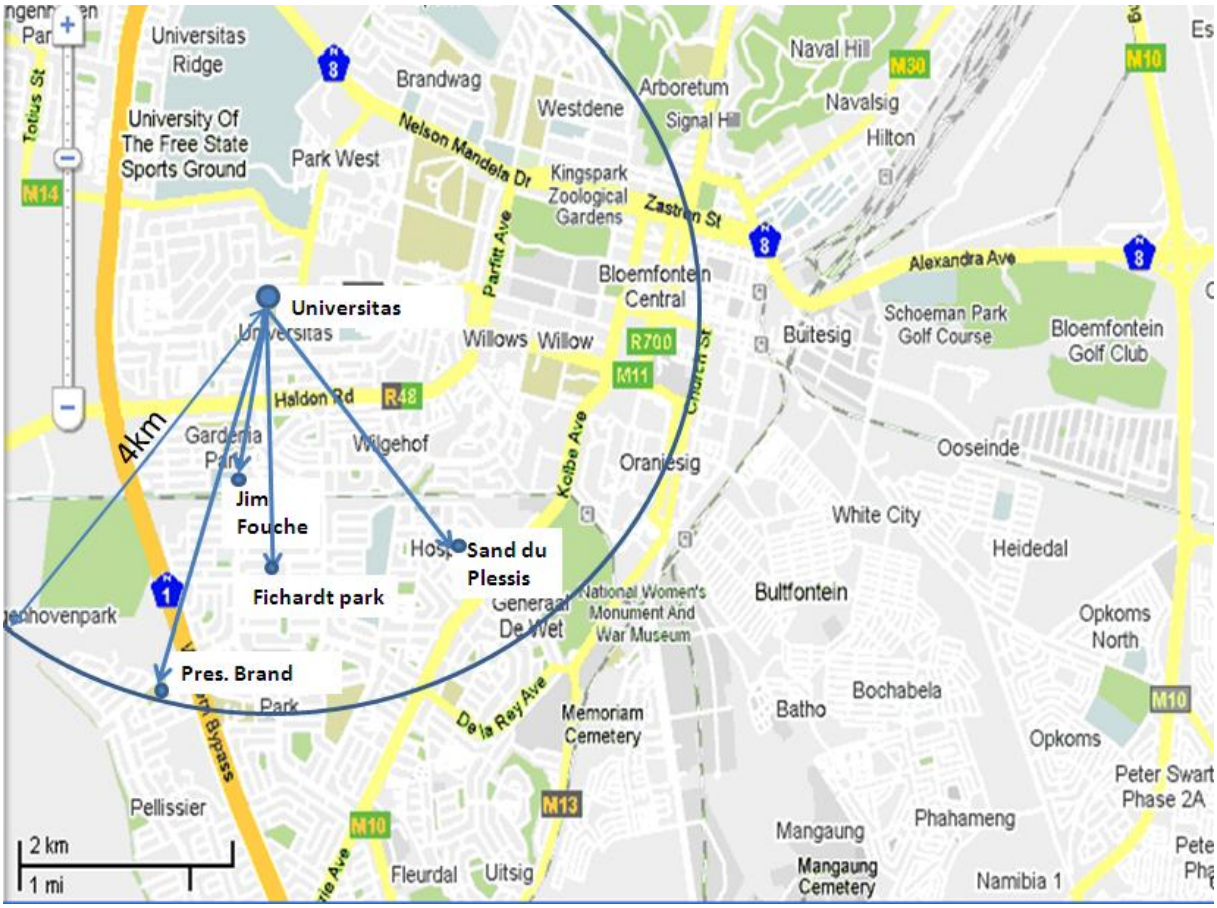
Appendix A: Map of Bloemfontein



Appendix B: Questionnaire

Skool.....
Respondent nr:.....

EETGEWOONTES, HOUDINGS EN PERSEPSIES TEENOOR KOS

Instruksies

- **Lees die vrae mooi en steek jou hand op as jy enige vrae het.**
- **<u>MOET NIE</u> jou naam op die blaai skryf nie.**
- **Jy gaan gevra word om vrae te antwoord oor jouself en oor die soort kos wat jy eet.**
- **Lees elke vraag mooi deur en trek dan ’n kruisie (X) in die blokkie wat jy kies.**
- **By sekere vrae mag jy meer as een blokkie merk.**
- **By sekere vrae gaan jy gevra word om die vraag te antwoord deur jou antwoord op die lyntjie neer te skryf.**
- **Jy mag jou hand opsteek as jy iets nie verstaan nie of as jy ’n vraag wil vra.**
- **Steek jou hand op as jy klaar is.**
- **Wag tot almal klaar geskryf het voor jy opstaan.**
- **Gee jou vraelys vir my voor jy loop.**
- **Jy mag jou potlood hou. Dit is nou joune.**
- **Jy mag nou omblaai en begin om die vrae te antwoord.**

AFDELING A

MAAK 'N KRUISIE (x) **IN DIE BLOKKIE WAT JY KIES**

1.In watter Graad is jy?

MAAK 'N KRUISIE (X) **IN DIE BLOKKIE WAT JY KIES**

☐ Graad 2	☐ Graad 5
☐ Graad 3	☐ Graad 6
☐ Graad 4	☐ Graad 7

2.Is jy 'n seun of 'n dogter?

MAAK ' N KRUISIE (X) **IN DIE BLOKKIE WAT JY KIES**

☐ Seun

☐ Dogter

3.Hoe oud is jy?

MAAK ' N KRUISIE (X) **IN DIE BLOKKIE WAT JY KIES**

☐ 7 jaar	☐ 11 jaar
☐ 8 jaar	☐ 12 jaar
☐ 9 jaar	☐ 13 jaar
☐ 10 jaar	☐ 14 jaar

4.Wat is jou huistaal?

MAAK ' N KRUISIE (X) **IN DIE BLOKKIE WAT JY KIES**

☐ Afrikaans

☐ Engels

☐ Sotho

☐ Ander (noem die taal)……

BLAAI OM…

5. Waar bly jy?

MAAK 'N KRUISIE (X) IN DIE BLOKKIE WAT JY KIES

- ☐ Bayswater
- ☐ Dan Pienaar
- ☐ Fauna
- ☐ Fichardtpark
- ☐ Fleurdal
- ☐ Gardeniapark
- ☐ Genl De Wet
- ☐ Heuwelsig
- ☐ Hospitaalpark
- ☐ Pellissier
- ☐ Pentagonpark
- ☐ Uitsig
- ☐ Universitas
- ☐ Universitasrif
- ☐ Wilgehof
- ☐ Willows
- ☐ Woodland Hills
- ☐ Langenhovenpark
- ☐ Ander(skryf in).....

6.Hoeveel sakgeld kry jy per maand?

MAAK 'N KRUISIE (X) IN DIE BLOKKIE WAT JY KIES

- ☐ R10 of minder
- ☐ Tussen R11 en R20
- ☐ Tussen R21 en R50
- ☐ Tussen R51 en R99
- ☐ R100 of meer
- ☐ Ek kry nie sakgeld nie

7.Hoeveel geld spandeer jy by die snoepie <u>op 'n slag</u>?

MAAK 'N KRUISIE (X) IN DIE BLOKKIE WAT JY KIES

- ☐ R5 of minder
- ☐ Tussen R6 en R10
- ☐ Tussen R11 en R20
- ☐ Tussen R21 en R50
- ☐ Tussen R51 en R99
- ☐ R100 of meer
- ☐ Ek koop niks by die snoepie nie

8.Hoeveel keer per week koop jy iets by die snoepie?

MAAK 'N KRUISIE (X) IN DIE BLOKKIE WAT JY KIES

☐ Elke dag
☐ Meeste dae
☐ Amper nooit
☐ Nooit

AFDELING B

MAAK 'N KRUISIE (x) IN DIE BLOKKIE WAT JY KIES

1.Bring jy 'n kosblik skooltoe?

MAAK 'N KRUISIE (X) IN DIE BLOKKIE WAT JY KIES

☐ Elke dag
☐ Meeste dae
☐ Amper nooit
☐ Nooit

BLAAI OM…

2. Wat het jy vandag in jou kosblik gehad?

JY MAG MEER AS EEN BLOKKIE MERK.MAAK 'N KRUISIE (X) IN DIE BLOKKIES WAT JY KIES

- ☐ Broodjie(s) met witbrood
- ☐ Broodjie(s) met bruinbrood
- ☐ Vars Vrug(te)
- ☐ Droë vrugte of rosyntjies
- ☐ Gedroogte vrugtestukkies
- ☐ Vrugterol
- ☐ Groente
- ☐ Grondboontjies/Neute
- ☐ Pretzels
- ☐ Jogurt
- ☐ "Drinking yoghurt"
- ☐ Versoete Melk/Milo
- ☐ Skyfies ("Chips")
- ☐ Sjokolade
- ☐ Ander Lekkergoed
- ☐ Soutbeskuitjies
- ☐ Pastei
- ☐ Muffin
- ☐ Koekies
- ☐ Water
- ☐ Aanmaak koeldrank
- ☐ Vrugtesap
- ☐ Gaskoeldrank
- ☐ Gewone melk
- ☐ Iets anders? (skryf dit neer) ……
- ☐ Ek het nie 'n kosblik gebring nie

3. As jy 'n toebroodjie gehad het, wat was daarop?

JY MAG MEER AS EEN BLOKKIE MERK.MAAK 'N KRUISIE (X) IN DIE BLOKKIES WAT JY KIES

- ☐ Margarien
- ☐ Marmite
- ☐ Bovril
- ☐ Kaas
- ☐ Kaassmeer
- ☐ Konfyt
- ☐ Grondboontjiebotter ("peanut butter")
- ☐ Vleis (soos ham of polonie)
- ☐ Stroop
- ☐ Toebroodjiesmeer("sandwich spread")
- ☐ Vissmeer
- ☐ Tamatie
- ☐ Iets anders? (skryf dit neer) ……
- ☐ Ek het nie 'n toebroodjie gehad nie

AFDELING C

SKRYF JOU ANTWOORD OP DIE OOP LYNTJIES NEER

1. Vertel my van watter eetgoed of drinkgoed in die snoepie hou jy die **meeste**?

……

……

……

……

……

2. Vertel my van watter eetgoed of drinkgoed in die snoepie hou jy die **minste**?

……

……

……

……

……

……

BLAAI OM..

3. Wat het jy **vandag** by die **snoepie gekoop**? Skryf alles neer wat jy gekoop het om te eet en te drink.

……

……

……

……

……

4. Verbeel jou die snoepie kan **enige ANDER** soorte eetgoed en drinkgoed verkoop. Skryf alles neer wat jy dan by die snoepie sou koop.

……

……

……

……

……

……

AFDELING D

VERTEL MY WAT JY BY ELKE SINNETJIE DINK. TREK 'N KRUISIE (X) IN DIE BLOKKIE OM VIR MY TE WYS.

1. Kinders wat ontbyt eet is slim.

Ja, ek stem saam	Nee, ek stem nie saam nie	Ek weet nie
		

2. Soetgoed kan kinders vet maak.

Ja, ek stem saam	Nee, ek stem nie saam nie	Ek weet nie
		

3. Die snoepie **moet** glad **nie** lekkers en koeldrank verkoop nie.

Ja, ek stem saam	Nee, ek stem nie saam nie	Ek weet nie
		

BLAAI OM...

4. Ek sal eerder vars vrugte as lekkers koop by die snoepie.

Ja, ek stem saam	Nee, ek stem nie saam nie	Ek weet nie
☺	☹	😐

5. Kinders moet eers gesonde kos eet voordat hulle lekkers eet.

Ja, ek stem saam	Nee, ek stem nie saam nie	Ek weet nie
☺	☹	😐

6. Ek hou van die smaak van groente.

Ja, ek stem saam	Nee, ek stem nie saam nie	Ek weet nie
☺	☹	😐

7. Ek hou daarvan om melk te drink.

Ja, ek stem saam	Nee, ek stem nie saam nie	Ek weet nie
☺	☹	😐

8. Vetterige kos is nie gesond vir kinders nie.

Ja, ek stem saam	Nee, ek stem nie saam nie	Ek weet nie
☺	☹	😐

9. Ek moet min snoepiekos eet wat my hande olierig maak, soos pasteie en skyfies.

Ja, ek stem saam	Nee, ek stem nie saam nie	Ek weet nie
☺	☹	😐

BLAAI OM...

10. KOM ONS SPEEL DAT JY KAN KIES WAT JY IN JOU KOSBLIK KAN PAK. TREK 'N KRUISIE (X) IN DIE BLOKKIE OM TE WYS WAT JY GAAN KIES

- Kies iets om te **eet**.

  MERK NET EEN BLOKKIE MET 'N KRUISIE (X)

'n Pastei	'n Bruinbrood toebroodjie met kaas en tamatie.
	

- Kies iets om te **drink.**

  MERK NET EEN BLOKKIE MET 'N KRUISIE (X)

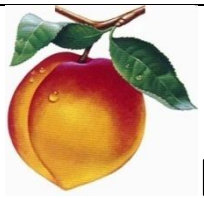
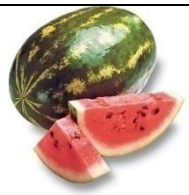
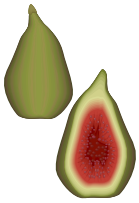
Vrugtesap	Melk	Gaskoeldrank	Aanmaakkoeldrank
			

- Kies nog iets vir jou kosblik.

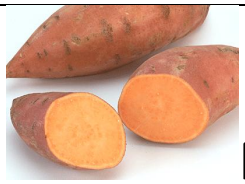
  MERK NET EEN BLOKKIE MET 'N KRUISIE (X)

Lekkergoed	Sjokolade	Vars vrug	Rosyntjies
			

11. TREK 'N KRUISIE (X) BY ELKE VRUG WAARVAN JY HOU.

 Appel	 Peer	 Piesang
 Lemoen	 Pynappel	 Perske
 Waatlemoen	 Spanspek	 Koejawel
 Naartjie	 Druiwe	 Mango
 Pruim	 Appelkoos	 Aarbei
 Vye	 Litchi	**BLAAI OM...**

12. TREK 'N KRUISIE (X) BY ELKE SOORT GROENTE WAARVAN JY HOU

 Tamatie	 Slaaiblare	 Komkommer
 Soetrissie	 Pampoen	 Beet
 Wortel	 Spinasie	 Kool
 Brokkoli	 Blomkool	 Patats
 Aartappel	 Groenboontjies	 Ertjies
 Mielies	 Sampioene	Baie dankie vir jou tyd☺

Appendix C: Assent form for learners

UNIVERSITEIT STELLENBOSCH

FAKULTEIT GESONDHEIDSWETENSKAPPE

INLIGTINGSTUK EN TOESTEMMINGSVORM VIR DEELNEMERS

TITEL VAN NAVORSINGSPROJEK: Skoolkinders in Bloemfontein se eetgewoontes en hoe hulle oor verskillende soorte kos dink en voel.

NAVORSER(S): Francette Bekker
ADRES: Edelingstraat 12, Universitas
KONTAKNOMMER: 084 408 6692

Liewe Leerder

My naam is Francette Bekker. Ek is ‘n dieetkundige en ek wil graag meer leer oor wat kinders dink van kos en wat julle graag koop by die snoepie. Ek nooi jou graag uit om my te vertel waarvan jy hou. Sal jy asseblief ’n paar vragies antwoord sodat ek meer kan weet daaroor.

Ek het alreeds jou ouer(s)/voog(de) hieroor vertel en hulle sê dat jy mag deelneem as jy wil. Jy kan self besluit of jy wil deelneem. Jy mag ook enige tyd besluit om op te hou, as jy wil. Niemand gaan weet wat jy antwoord nie. Daar is ook nie ‘n regte of verkeerde antwoord nie.

As jy ja sê om deel te neem, gaan ek vir jou vra om ‘n paar vrae te antwoord op ‘n papier. Jy sal so 15 minute besig wees. As jy nie weet wat om te doen nie, steek asseblief jou hand op sodat ek jou kan wys. As jy klaar is kan jy die vragies vir my gee. Jy mag die potlood en uitveer saam met jou neem.

Ek gaan vir jou lees wat op die ander bladsy staan. Sal jy asseblief jou naam op die papier skryf as jy lus voel om deel te neem. Gee dit dan vir die assistent.

Baie dankie. Dit is baie gaaf van jou om my te help.

Francette Bekker

Wat is navorsing?
Deur navorsing leer ons hoe dinge (en mense) werk. Ons gebruik navorsingsprojekte of -studies om meer oor siektes uit te vind. Navorsing leer ons ook hoe om siek kinders beter te help of te behandel.

Waaroor gaan hierdie navorsingsprojek?
Hierdie navorsing kyk na skoolkinders se eetgewoontes, dit kyk na watter soort kos kinders hou en dit kyk ook watter soort kos kinders koop by die skool se snoepie.

Hoekom vra julle my om aan hierdie navorsingsprojek deel te neem?
Jou skool is uitgekies om aan die navorsing deel te neem. Net ‘n sekere hoeveelheid kinders in elke graad kan deelneem en jou naam is een van die name wat getrek is.

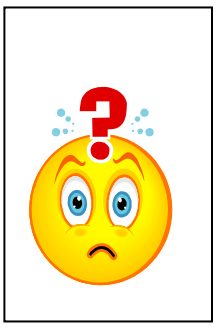
Wie doen die navorsing?
Ek is ‘n dieetkundige. Ek werk vir die Departement van Gesondheid. Ek wil graag meer uitvind oor skoolkinders in Bloemfontein se eetgewoontes en hoe hulle oor verskillende soorte kos dink en voel.

Wat sal in hierdie studie met my gebeur?
Ek gaan jou vra om ‘n vraelys in te vul. ‘n Vraelys is ‘n klomp vrae wat amper lyk soos ‘n toets. Die vraelys het vrae oor die soort kos wat jy skool toe bring, daar is vrae oor die soort kos wat jy by die snoepie koop en daar is vrae oor die soort kosse waarvan jy hou. ‘n Klein groepie kinders in elke graad gaan ook vir ‘n halfuur saam met my gesels oor kos en jy kan dan vir my vertel waarvan jy hou en waarvan jy nie hou nie.

Kan enigiets fout gaan?
Nee, niks kan fout gaan nie. Ons gaan net saam die vraelys invul en ook saam gesels.

Watter goeie dinge kan in die studie met my gebeur?
Die navorsing kan help dat jou skool se snoepie die soorte kos verkoop wat die beste is vir kinders wat groei.

Sal enigiemand weet wat ek neerskryf op my vraelys?
Nee, jy mag glad nie jou naam op die vraelys skryf nie. So niemand gaan weet wat jy neergeskryf het nie.



Met wie kan ek oor die studie praat?
Jy kan met Francette Bekker praat as jy vrae het. Ek is die navorser wat die studie doen. My telefoonnommer is 0844086692.

Wat gebeur as ek nie wil deelneem nie?

As jy nie wil deelneem aan die navorsing nie dan merk jy net die blokkie hieronder wat sê "NEE". As jou ouers toestemming gegee het dat jy mag deelneem, maar jy wil nie deelneem nie dan merk jy ook die blokkie wat se "NEE". As jy besluit om aan die navorsing deel te neem dan mag jy enige tyd jou besluit verander sonder om in enige moeilikheid te beland.

Verstaan jy hierdie navorsingstudie, en wil jy daaraan deelneem?

JA	NEE

Het die navorser ál jou vrae beantwoord?

JA	NEE

Verstaan jy dat jy kan ophou deelneem net wanneer jy wil?

JA	NEE

_____ _____

Handtekening van kind Datum

Appendix D: Discussion guide

1. **Verwelkoming**
   Verwelkom leerders en stel jouself en assistent voor.
   Verduidelik hoe die besprekings gaan verloop en waaroor die leerders gaan gesels.
   Verduidelik hoekom daar ‘n bandopnemer is.
   Vra dat elke leerder skriftelik toestemming gee indien hy/sy instem om deel te neem aan die bespreking.
2. **Kennismaking en inleiding**
   Vertel vir my wat is julle stokperdjies?
   Gesels bietjie met mekaar oor julle gunsteling sport. Aan watter soort sport neem julle deel?
   Het julle troeteldiere? Watter soort?
3. **Eetgewoontes**
   Wat is julle gunsteling kos?
   Wat is julle gunsteling kos by die huis? Hoekom?
   Wat is julle gunsteling kos vir jou kosblikkie? Hoekom?
   Wat is julle gunsteling kos by die skool? Hoekom?
   Hoeveel keer eet julle in ‘n dag?Hoekom?
   Eet julle ontbyt?Wat eet julle vir ontbyt?
4. **Snoepie**
   Wat koop julle by die snoepie?Hoekom?
   Wat verkoop die snoepie alles wat vir julle lekker is?
   Wat verkoop die snoepie wat nie vir julle lekker is nie?
   Wat moet die snoepie nog alles verkoop?
   Hou julle van die skool se snoepie? Hoekom?
   Dink julle ander skole moet ook dieselfde soort snoepie hê?
   Wat dink ander skole se kinders van julle snoepie?
5. **Gesonde en ongesonde kos**
   Watter soort kos behoort kinders te eet? Eet julle hierdie soorte kos?
   Wat dink julle van vrugte? Watter soort vrugte eet julle?
   Wat dink julle van groente? Watter soort groente eet julle?
   Hou julle van melk? Hoe gereeld drink julle melk?
   Watter soorte kos is sleg vir kinders?
   Dink julle kinders mag lekkergoed eet? Hoekom?
   Dink julle kinders mag kos eet wat mens se hande vetterig maak? Hoekom?
6. **Bedankings**
   Bedank leerders vir hul deelname.

Appendix E: Tuck shop data collection form

Nutritional information collection form

Date:

Tuck shop A/B

Nr	Item description	Labelled Y/N	Weight(g)	Energy(kJ)	CHO(g)	Prot(g)	Fat(g)	Sugar(g)	Fibre(g)	Na(mg)	Need recipe Y/N
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

Appendix F: Letter to the Free State Departmentof Education

Director: Quality Assurance
Room 401
Syfrets Building
Free State Department of Education
Private Bag X20565
Bloemfontein
9300.

Dear Sir/Madam

PERMISSION TO CONDUCT RESEARCH IN BLOEMFONTEIN PRIMARY SCHOOLS

The purpose of this letter is to obtain permission from the Department of Education to conduct a research project in selected schools in Bloemfontein.
This project, titled "The provision of healthy food in a school tuck shop: does it influence primary school children's perceptions, attitudes and behaviour towards healthy eating?", will be conducted by a Registered Dietician, Francette Bekker, in partial fulfilment of the requirements for the degree of Master of Nutrition at the University of Stellenbosch.

The prevalence of overweight and obesity in children is increasing worldwide at an alarming rate. To prevent children from becoming overweight and obese adults with increased risk for diabetes, cardiovascular disease and other lifestyle diseases, research suggests that the school environment might be the ideal place for the promotion of healthy eating habits and thereby influence health behaviour early in life.
This research project aims to determine primary school children's perceptions, attitude and behaviour towards healthy eating, by comparing a school that has implemented a healthy tuck shop-concept in January 2009 to a similar school which runs a traditional tuck shop (selling food items with a high fat and sugar content).
The findings of the study should provide us with valuable information which will enable policy makers to advocate the introduction of healthier food choices in tuck shops in an attempt to reduce the prevalence of overweight and obesity in children, allowing our youth to become healthy adults.

The research requires that a sample of primary school children in grade 2 to 7 complete a questionnaire at the school, after break time. The questionnaire assesses types of food bought at the tuck shop, food brought from home in lunchboxes and perceptions, attitude and behaviour towards healthy eating. Completion of the questionnaire will take about 15 minutes, where-after children will return to their classrooms to resume their lessons. All principals, parents/guardians and learners will be asked to sign an informed consent form before learners can take part in the study.

[redacted] primary school was automatically selected to take part in the study because of their unique tuck shop. Two other schools with similar profiles in the same area of Bloemfontein was chosen by using random sampling, these are [redacted] and [redacted]
School [redacted] will only be used during the pilot study. Children from all races will be included in the study.

After completion of my thesis, the Department of Education will receive recommendations for possible implementation of the concept and practice of a healthy tuck shop to other schools, in order to advance healthy eating habits among school children.

This study has been approved by the Health Research Ethics Committee at Stellenbosch University (Ethics number N10/08/246, see proof attached) and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC).

The research protocol and the addenda have been attached for further information, if necessary.

Thank you for considering my request.

Kind Regards

Francette Bekker
Registered Dietician RD(SA) and Principal Investigator

Appendix G: Letter to school principals

Die skoolhoof: [redacted] primêre skool

Geagte meneer

TOESTEMMING TOT NAVORSING IN [redacted] PRIMÊRE SKOOL.

Die doel van hierdie brief is om toestemming te verleen om ‘n navorsingsprojek rakende kindervoeding met die titel “Die voorsiening van gesonde voedsel in ‘n skoolsnoepie: beïnvloed dit laerskoolkinders in Bloemfontein se persepsies, houdings en gedrag teenoor gesonde eetgewoontes?” in u skool af te lê. Die projek sal uitgevoer word deur ‘n Geregistreerde Dieetkundige, Francette Bekker, as deel van die vereistes van die Meestersgraad in Voeding aan die Universitiet van Stellenbosch.

Soos u weet, is die voorkoms van vetsug in kinders besig om regoor die wêreld toe te neem. Om vetsug in kinders te voorkom en om te verseker dat kinders gesond leef, is skole besig om die tipe eetgoed wat beskikbaar is tydens skoolure te verander na gesonder keuses. Hierdie projek het dit ten doel om laerskoolkinders in Bloemfontein se houding, optrede en persepsie teenoor gesonde eetgewoontes te bepaal. Die projek vergelyk skole met verskillende soorte snoepies met mekaar om te bepaal of ‘n gesonde snoepie in ‘n skool enige noemenswaardige verskil kan maak. Die projek sal waardevolle inligting oplewer wat kan lei tot veranderinge in die tradisionele snoepie soos ons dit ken.

Volgens die navorsingsprojek se protokol, is dit nodig dat ‘n steekproef van u leerders ‘n vraelys invul wat ongeveer 15 minute sal neem. Die vraelys meet houding, optrede en persepsie teenoor gesonde eetgewoontes. Die projek sal tydens skoolure plaasvind by u skool. Die navorser sal verkies as die vraelys gedurende ‘n periode na pouse ingevul word waartydens kinders se geheue nog vars is aangaande wat hulle gedurende pouse gekoop het by die snoepie en wat hulle in hulle kosblik skooltoe gebring het om te eet. Die projek vereis ook dat vier tot ses leerlinge per graad aan ‘n fokusgroepbespreking deelneem wat nie langer as 30minute sal duur nie.
Kinders sal anoniem bly tydens die invul van die vraelyste en gedurende die fokusgroepbesprekings en as die navorsing lei tot publikasie in ‘n wetenskaplike joernaal sal die skool se naam nie genoem word nie. U skool sal wel die resultate van die navorsing ontvang.
Indien u sou belangstel om meer te lees oor die projek, heg ek dus vir u die navorsingsprotokol, vraelys, skedule vir die fokusgroepbeprekings en ouer/voog- en kindertoestemmingsbriewe aan.

Hierdie studie is deur die Vrystaatse Departement van Onderwys asook die Gesondheid Navorsingsetiekkomitee (GNEK) van die Universiteit Stellenbosch goedgekeur (NommerN10/08/246) en sal uitgevoer word volgens die etiese riglyne en beginsels van die Internasionale Verklaring van Helsinki, South African Guidelines for Good Clinical Practice en die Mediese Navorsingsraad (MNR).

By voorbaat dank dat u bereid is om my versoek te oorweeg in ‘n positiewe lig.

Vriendelike groete

Francette Bekker
Registreerde Dieetkundige RD(SA) en Hoofnavorser

Appendix H: Letter to school tuck shop managers

Snoepiebestuurder: [redacted] primêre skool

Geagte mevrou [redacted]

TOESTEMMING TOT NAVORSING IN [redacted] PRIMÊRE SKOOL SE SNOEPIE.

Die doel van hierdie brief is om toestemming te verleen om ‘n navorsingsprojek rakende kindervoeding met die titel “Die voorsiening van gesonde voedsel in ‘n skoolsnoepie: beïnvloed dit laerskoolkinders in Bloemfontein se persepsies, houdings en gedrag teenoor gesonde eetgewoontes?” in u snoepie af te lê. Die projek sal uitgevoer word deur ‘n Geregistreerde Dieetkundige, Francette Bekker, as deel van die vereistes van die Meestersgraad in Voeding aan die Universitiet van Stellenbosch.

Soos u weet, is die voorkoms van vetsug in kinders besig om regoor die wêreld toe te neem. Om vetsug in kinders te voorkom en om te verseker dat kinders gesond leef, is skole besig om die tipe eetgoed wat beskikbaar is tydens skoolure te verander na gesonder keuses. Hierdie projek het dit ten doel om laerskoolkinders in Bloemfontein se houding, optrede en persepsie teenoor gesonde eetgewoontes te bepaal. Die projek vergelyk skole met verskillende soorte snoepies met mekaar om te bepaal of ‘n gesonde snoepie in ‘n skool enige noemenswaardige verskil kan maak. Die projek sal waardevolle inligting oplewer wat kan lei tot veranderinge in die tradisionele snoepie soos ons dit ken.

Volgens die navorsingsprojek se protokol, is dit nodig dat ‘n volledige opname van die verskillende soorte voedsel en drinkgoed in die snoepie gemaak word. Voedsel met etikette waarop voedingsinligting verskyn sal gebruik word sodat voedingsinligting neergeskryf kan word. Items wat nie verpak is nie of nie voedingsinligting op het nie sal geweeg word. In sekere gevalle sal resepte ook aangevra word sodat volledige voedselontledings gedoen kan word. Die hooFnavorser, Francette Bekker, en ‘n assistent sal die opnames in u snoepie doen gedurende ‘n tyd van die dag van u pas. Die opname van die snoepiekos sal plaasvind op dieselfde dae wat leerders vraelyste invul oor huLle eetgewoontes en hul houding en gedrag teenoor gesonde kos.

Indien u sou belangstel om meer te lees oor die projek, heg ek dus vir u die navorsingsprotokol aan.

Hierdie studie is deur die Vrystaatse Departement van Onderwys asook die Gesondheid Navorsingsetiekkomitee (GNEK) van die Universiteit Stellenbosch goedgekeur (NommerN10/08/246, bewyse aangeheg) en sal uitgevoer word volgens die etiese riglyne en beginsels van die Internasionale Verklaring van Helsinki, South African Guidelines for Good Clinical Practice en die Mediese Navorsingsraad (MNR).

By voorbaat dank dat u bereid is om my versoek te oorweeg in ‘n positiewe lig.

Vriendelike groete

Francette Bekker
Registreerde Dieetkundige RD(SA) en Hoofnavorser

Appendix I: Parental consent forms in Afrikaans, English and Sesotho

DEELNEMERINLIGTINGSBLAD EN -TOESTEMMINGSVORM VIR GEBRUIK DEUR OUERS/WETTIGE VOOGDE

TITEL VAN DIE NAVORSINGSPROJEK:
Die voorsiening van gesonde voedsel in 'n skoolsnoepie: beïnvloed dit laerskoolkinders in Bloemfontein se persepsies, houdings en gedrag teenoor gesonde eetgewoontes?

VERWYSINGSNOMMER: N10/08/246

HOOFNAVORSER: Francette Bekker

KONTAKNOMMER: 084 408 6692

U kind *(of pleegkind, indien van toepassing*) word genooi om deel te neem aan 'n navorsingsprojek. Lees asseblief hierdie inligtingsblad op u tyd deur aangesien die detail van die projek daarin verduidelik word. Indien daar enige deel van die projek is wat u nie ten volle verstaan nie, is u welkom om die hooFnavorser, Francette Bekker te skakel. Dit is baie belangrik dat u ten volle moet verstaan wat die navorsing behels en hoe u kind daarby betrokke kan wees. U kind se deelname is ook **volkome vrywillig** en dit staan u vry om deelname te weier. U kind sal op geen wyse hoegenaamd negatief beïnvloed word indien u sou weier om hom/haar te laat deelneem nie. U mag u kind ook te eniger tyd aan die studie onttrek, selfs al het u ingestem om hom/haar te laat deelneem.

Hierdie studie is deur die Gesondheid Navorsingsetiekkomitee van die Universiteit Stellenbosch goedgekeur en sal uitgevoer word volgens die etiese riglyne en beginsels van die Internasionale Verklaring van Helsinki en die Etiese Riglyne vir Navorsing van die Mediese Navorsingsraad (MNR).

Wat behels hierdie navorsingsprojek?

- Die voorkoms van vetsug in kinders is besig om regoor die wêreld toe te neem.
- Om vetsug in kinders te voorkom en om te verseker dat kinders gesond leef, is skole besig om die kos wat beskikbaar is tydens skoolure te verander na gesonder keuses.
- Hierdie projek is gemik daarop om laerskoolkinders in Bloemfontein se eetgewoontes en voor- en afkeure vir verskillende soorte kos te bepaal.
- Die projek vergelyk skole met verskillende soorte snoepies met mekaar om te bepaal of 'n gesonde snoepie in 'n skool 'n noemenswaardige verskil kan maak.
- Die projek sal waardevolle inligting oplewer wat kan lei tot veranderinge in die gewone snoepie soos ons dit ken.
- U kind sal slegs mag deelneem as u toestemming gee en hierdie vorm teken en terugstuur aan u kind se skool.
- Die projek sal tydens skoolure plaasvind.

- U kind sal eers ‘n toestemmingsbrief teken voordat hy/sy mag deelneem.
- Indien u kind so voel mag hy/sy weier om deel te neem.
- As u kind toestem tot deelname sal hy/sy ‘n vraelys invul wat ongeveer 15-20 minute sal neem.
- Die vraelys sal anoniem ingevul word en daar sal geen manier wees waarop die inligting op die vraelys aan u kind gekoppel kan word nie.
- Die vraelys meet houding, gedrag en persepsie teenoor gesonde eetgewoontes.
- Ses leerlinge per graad sal ook gekies word om deel te neem aan ‘n groepbespreking oor gesonde en ongesonde kos, wat nie langer as 30 minute sal duur nie.

Waarom is u kind genooi om deel te neem?

- Ongelukkig kan al die kinders in die skool nie deelneem aan die studie nie, a.g.v. tyd en befondsing. Dus het die navorser en statistikus d.m.v. statistiese metodes ‘n ewekansige steekproef van kinders getrek en u kind is gekies om deel te neem aan die studie.

Wat sal u verantwoordelikhede wees?

- As u toestemming gee dat u kind mag deelneem sal u verantwoordelik wees om hierdie brief te teken en terug te stuur na die skool. Daar sal ook van u verwag word om u kind in te lig rakende die studie en wat dit behels.

Sal u kind voordeel trek deur deel te neem aan hierdie navorsing?

- U kind sal nie persoonlik voordeel trek uit hierdie navoring nie, maar u kind sal bydra tot waardevolle inligting wat deurgegee sal word aan u kind se skool en die Departement van Onderwys.

Is daar enige risiko's verbonde aan u kind se deelname aan hierdie navorsing?

- Nee, daar is geen risiko nie.

Wie sal toegang hê tot u kind se vraelys?

- Slegs die hoofnavorser en die statistikus sal die inligting hanteer en verwerk. Deelnemers sal anoniem bly en alle inligting sal vertroulik en beskermend hanteer word. Die deelnemende skole sal ook anoniem bly wanneer die inligting gebruik word vir ’n publikasie in ‘n wetenskaplike tydskrif.

Sal u of u kind betaal word vir deelname aan die projek en is daar enige koste verbonde aan deelname?

- Nee, u of u kind sal nie betaal word vir deelname aan die projek nie. Deelname aan die projek sal u ook niks kos nie.

Is daar enigiets anders wat u moet weet of doen?

- U kan die Gesondheid Navorsingetiekkomitee kontak by 021-938 9207 of 021-938 9111 indien u enige bekommernis of klagte het wat nie bevredigend deur die navorser hanteer is nie.
- U sal 'n afskrif van hierdie inligtings- en toestemmingsvorm ontvang vir u eie rekords.

Toestemming: Kinders met 'n intellektuele ouderdom van 7 jaar en ouer moet toestem tot deelname aan navorsing.

Instemming van minderjarige

Ek (naam van kind/minderjarige) ……..…… is genooi om deel te neem aan bogenoemde navorsingsprojek.

- Die hoofnavorser en my ouers het die besonderhede van bogenoemde navorsingsprojek aan my verduidelik en ek verstaan wat hulle aan my gesê het.
- Hulle het ook aan my verduidelik dat die projek die volgende insluit: die invul van 'n vraelys oor die kos by snoepies tydens skoolure en moontlike deelname aan 'n groepbespreking oor gesonde en ongesonde kos.
- Ek weet ook dat ek enige tyd aan die navorsingsprojek kan onttrek indien ek ongelukkig is.
- Deur my naam hieronder in te vul, onderneem ek om vrywillig aan die navorsingsprojek deel te neem. Ek bevestig ook dat ek nie deur my ouers of die hoofnavorser gedwing is om deel te neem nie.

…… ……

Naam van kind Onafhanklike getuie
(Deur kind geskryf te word indien moontlik)

Verklaring deur ouer/wettige voog

Met die ondertekening van hierdie dokument onderneem ek, (*naam van ouer/wettige voog*) ……., om my kind *(naam van kind)*
……., wat ..... jaar oud is, te laat deelneem aan 'n navorsingsprojek getiteld "Die voorsiening van gesonde voedsel in 'n skoolsnoepie: beinvloed dit laerskoolkinders in Bloemfontein se persepsies, houdings en gedrag teenoor gesonde eetgewoontes?"

Ek verklaar dat:

- Ek hierdie inligtings- en toestemmingsvorm gelees het of aan my laat voorlees het en dat dit in ’n taal geskryf is waarin ek vaardig en gemaklik mee is.
- My kind moet instem om aan die navorsingsprojek deel te neem as hy/sy ouer as 7 jaar is, en dat sy/haar INSTEMMING op hierdie vorm aangeteken sal word.
- Ek geleentheid gehad het om vrae te stel en dat al my vrae bevredigend beantwoord is.
- Ek verstaan dat deelname aan hierdie projek **vrywillig** is en dat daar geen druk op my geplaas is om my kind te laat deelneem nie.
- My kind enige tyd aan die projek mag onttrek en dat hy/sy nie op enige wyse daardeur benadeel sal word nie.

Geteken te (*plek*) ..... op (*datum*) …….. 2011.

…… ……

Handtekening van ouer/wettige voog Handtekening van getuie

Verklaring deur navorser

Ek (naam) …… verklaar dat:

- Ek die inligting in hierdie dokument verduidelik het aan die ouer(s)/voog(de) van die kind.
- Ek hom/haar aangemoedig het om vrae te vra en voldoende tyd gebruik het om dit te beantwoord.
- Ek tevrede is dat hy/sy al die aspekte van die navorsingsprojek soos hierbo bespreek, voldoende verstaan.
- Ek nie ’n tolk gebruik het nie.

Geteken te (*plek*) ..... op (*datum*) …….. 2011.

…… ……

Handtekening van navorser Handtekening van getuie

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM FOR USE BY PARENTS/LEGAL GUARDIANS

TITLE OF THE RESEARCH PROJECT:
The provision of healthy food in a school tuck shop: Does it influence Bloemfontein primary school children's perceptions, attitudes and behaviour towards healthy eating?

REFERENCE NUMBER: N10/08/246

PRINCIPAL INVESTIGATOR: Francette Bekker

CONTACT NUMBER: 084 408 6692

Your child *(or ward, if applicable*) is being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please contact the principal investigator, Francette Bekker, if you have any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how your child could be involved. Also, your child's participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you or your child negatively in any way whatsoever. You are also free to withdraw him/her from the study at any point, even if you do initially agree to let him/her take part.

This study has been approved by the Health Research Ethics Committee at Stellenbosch University and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

What is this research study all about?

- Worldwide the prevelance of childhood obesity is increasing.
- In order to prevent childhood obesity and to ensure that children have healthier lifestyles, some schools are starting to control the availability of food items during school hours and moving towards offering healthier food choices.
- This project aims to determine Bloemfontein primary school children's eating habits and their preferences for different foods.
- This project compares schools with different tuck shops to determine if a "healthy" tuck shop in a school can make a significant difference.
- This project may lead to valuable information which may in turn change the current conventional tuck shop system.

- Your child will only be allowed to participate if you give permission and if you return this form to your child's school.
- The project will take place during school hours.
- Your child will need to sign an assent form before he/she is allowed to participate.
- Your child may decide not to participate.
- If you give permission for participation, your child will complete a questionnaire which will take about 15-20 minutes to complete.
- The questionnaire will be completed anonymously and there will be no manner in which the information can be traced back to your child.
- The questionnaire aims to determine attitudes, perceptions and behaviour towards healthy eating.
- Six learners per grade will also be selected to participate in group talks about healthy and unhealthy food. These talks will not last longer than 30 minutes.

Why has your child been invited to participate?

- Unfortunately all the children in your child's school cannot participate due to limited time and resources. The principal researcher and statistician used statistical methods to obtain a random sample of children in each of the participating schools and therefore your child was selected to take part in this study.

What will your responsibilities be?

- If you give permission for your child's participation, you will need to take the responsiblity to sign this letter and to return it to the school. It will also be expected of you to explain to your child what this research project entails.

Will your child benefit from taking part in this research?

- Your child will not benefit directly by participating, but your child's participation will contribute to valuable information which will be given to the school and the Department of Education.

Are there any risks involved in your child taking part in this research?

- No, there are no risks involved.

Who will have access to your child's questionnaire?

- Only the principal investigator and statistician will see the information and process it. The identity of the participant will remain anonymous and all information collected will be treated as confidential and protected. If it is used in a publication or thesis, the identity of the participating schools will remain anonymous.

Will you or your child be paid to take part in this study and are there any costs involved?

- You or your child will not be paid to take part in the study. There will be no costs involved for you if your child does take part.

Is there anything else that you should know or do?

- You can contact the Health Research Ethics Committee at 021-938 9207 or 021-938 9111 if you have any concerns or complaints that have not been adequately addressed by your child's study doctor.
- You will receive a copy of this information and consent form for your own records.

Assent: Children with an intellectual age of 7 and above must give assent to participate in research.

Consent of child

I (name of child) ……. have been invited to take part in the above mentioned research project.

- The prinicpal investigator and my parent/legal guardian explained the details of the above mentioned research project to me and I understand what they said.
- They also explained that the project includes: the completion of a questionnaire and possible participation in group talks about healthy and unhealthy food.
- If I am unhappy, I know that I can withdrawn from the research project at any time.
- By writting my name below, I hereby undertake to voluntarily participate in the research poject. I also declare that I was not forced to participate by the principal investigator or my parent(s)/legal guardian(s).

…… ……

Name of child (Written by child, if possible)

Signature of independent witness

Declaration by parent/legal guardian

By signing below, I *(name of parent/legal guardian)* ……. agree to allow my child (name of child) …… who is ……. years old, to take part in a research study entitled *(*The provision of healthy food in a school tuck shop: Does it influence Bloemfontein primary school children's perceptions, attitudes and behaviour towards healthy eating?*)*

I declare that:

- I have read or had read to me this information and consent form and that it is written in a language with which I am fluent and comfortable.

- If my child is older than 7 years, he/she must agree to take part in the study and his/her ASSENT must be recorded on this form.
- I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that taking part in this study is **voluntary** and I have not been pressurised to let my child take part.
- I may choose to withdraw my child from the study at any time and my child will not be penalised or prejudiced in any way.
- My child may be asked to leave the study before it has finished if the study doctor or researcher feels it is in my child's best interests, or if my child do not follow the study plan as agreed to.

Signed at (*place*) ..... on (*date*) ……..……2011

…… **……**

Signature of parent/legal guardian Signature of witness

Declaration by investigator

I *(name)* …… declare that:

- I explained the information in this document to parent/legal guardian of this child.
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understand all aspects of the research, as discussed above
- I did not use an interpreter

Signed at (*place*) ..... on (*date*) …….. 2011.

……

Signature of investigator

TUMELLO LE BOITLAMO BA MOTSWADI /MOHLOKOMEDII WA MOLAO HO LOKOLLA NGWANA HO NKA KAROLO PHUPUTSONG/ DIPATLISISONG TSA BOITHUTO

SEHLOHO SA PHUPUTSO

Phano ya dijo tse phedisang /nepahetseng mabenkeleng a thekiso ya dijo dikolong: Na hona le tsutsumetso ya boitwaro, mehopolo, mekgwa le ditlwaelo tsa hoja ka mokgwa o nepahetseng?

'REFERENCE': N10/08/246

MOFUPUTSI: Francette Bekker

NOMORO YA MOHALA: 084 408 6692

Ngwana wa hao (karolo ya motse '*ward*', kgetha ho nepahetseng) o memelwa ho nka karolo ho dipatlisiso tsa boithuto. O kopua ho bala ka hloko tlhaloso e latelang ka phuputso ena. Ha hona le moo o sa utlwisising kapa o batla tlhaloso tse mabapi le phuputso ena letsetsa Mofuputsi Francette Bekker. Ho bohlokwa hore o kgonthisise hore o utlwisisa dipatlisiso di ipapisitse le eng, mme o utlwisisa hore ngwana wa hao o tla nka karolo efeng.

Ngwanawa hao o lokela ho ithaopa ho nka karolo, mme le wena ha o gobelwe ho dumella ngwana ho nka karolo. Ha osa dumelle ngwana ho nka karolo a ke ke a hlahelwa kapa a lahlehelwa ke letho. Ngwana ona le bolokolohi ba ho ikgula neng kapa neng, ha ase a ikutlwa a sa kgotsofalla ho nka karolo diphupotsong.

Phuputso yena ya boithuto e ananetswe ke Komiti ea Melawana ya boitswaro ba Dipatlisiso tsa Bophelo ya University ya Stellenbosch.Dipatlisiso di tla latela melawana le ditataiso tsa Phatlalatso ya Machaba ya Helsinki, melawana ye nepahetseng ya tsamaiso ya Ditshebeletso tsa Bophelo ya Afrika Borwa, le ditataiso tsa ho fuputsa tsa lefapha la bongaka lo Diphuputso.

Phuputso e mabapi le eng?

- Phepetso e lefatšeng kaofela ya bana ba nonneng ho feteletseng (mmele e metenya).
- Dikolo tse ding di gadile ho laola phano ya dijo ka nako ya sekolo, difana le ho kgothaletsa dijo tse nepahetseng ele ho thibela monono o feteletseng le ho tiisa hore bana ba phela bophelo bo botle.

- Phuputsoena e batlisisa mekgwa ya hoja le dijo tse ratwang ke bana ba dikolo tsa Primary tsa Bloemfontein.
- Phuputso e tlilo bapisa dikolo tse nang le mabenkele a dijo (Tuck shops) ho sheba hore na hoba le lebenkele le rekisang dijo tse nepahetseng ho tlisa phapang.
- Mohlomong phuputso ena eka tlisa tsebo e ka fetolang mekgwa ya jwoale (e teng) ya mabenkele a dijo dikolong.
- Ngwana a ka nka karolo phuputsong yena ka tumello ya motswadi ha a kgutlisetsa foromo ena sekolong.
- Diphuputso di tla etswa ka dihora tsa sekolo.
- Ngwana o tla lokela ho tekena foromo pele a nka karolo diphuputsong.
- Ngwana ona le tokelo ya ho etsa kgeto ya ho tlohella ho nka karolo diphuputsong.
- Ngwana ya filweng tumello o tla tlatsa lenane la dipotso (Questinnaire) le nkang metsotso e 15 ho isa ho 20 min.
- Ha ho hlokahale hore ngwana a ngwole lebitso (ha ho hlokahale boitsibiso) ka hoo ha ho letho le ka amangwang le ngwana ofe kapa ofe.
- Dipatlisiso di leka ho fuputsa boitswaro, kutlwisiso le mekgwa mabapi le phepo e dijo tse nepahetseng. (tse phidisang)
- Hotla kgethwa baithutwana ba tsheletseng ho etsa puo ya metsotso e sa feteng 30 min ka dijo tse nepahetseng le tse sa nepahalang.

Hobaneng Ngwana wa hau a memilwe?

- Ka lebaka la nako le disebediswa tse fokolang, bana ba sekolo re ke ke ra ba nka karolo kaofela. Mofuputsi le Mma/Ralipalopalo ba sebedisitse mekgoa ya ho kgetha sehlopha (representative sample) sa bana se emelang bana bohle sekolong se seng le se seng se nkang karolo.

Tswanelo ya hau ke efe?

- Ha o dumeletse ngwana ho nka karolo, u lokela ho tekena le ho kgutlisa foromo ena, mme o hlalosetse ngwana hore phuputso ena ke ya eng.

Ngwana u tla fumana moputso?

- Bana ha bana ho fuwoa meputso empa tsebo etla hlahiswa ke phuputso etla fua dikolo le Lefapha la Thuto.

Na hona le se ka hlahisetsang bana kotsi ha ba nka karolo phuputsong?

- Che, ha ho kotsi e ka hlahelang bana.

Ke mang ya tla sebedisa manane- potso (questionnaires) tsa bana?

- Mofuputsi le Mma/Ralipalopalo ba tla sebedisa dikarabo tsa bana empa ba sena mabitso. Tsebo yohle etla bolokwa moo eke keng ya fumanwake batho ba bang. Etlasebediswa bakeng sadingolwa tsa Mofuputsi (thesis), ha ena ho senola mabitso a Dikolo tse nkileng karolo.

Na wena le ngwana le tla fua moputso kapa hona le ditjeo tsa ho nka karolo?

- Wena le ngwana ha lena ho patalwa kapa ho pataliswa.

Na hona le seseng seo u ka ratang hosetseba ka phuputso ena?

- O ka botsa Komiti ya Melawana ya Boitswaro ba Dipatlisiso tsa Bophelo (Health Research Ethics Committee) at 021-938 9207 or 021-938 9111; leditletlebo kapa kgwaoka se seng se amanang le ngwana o ka fumana hlakisetso teng.
- O tla fumana khopi ya foromo ena ha o rata ho ipolokela yona.

Bopaki ba Kamohelo (Assent): Bana ba hlalohanyo ya dilemo tse 7 kapa ho feta mooba lokela ho fana ka kamohelo ya hore ba nka karolo ka ntle le qobello/ tshusumetso hore a nke karolo diphuputsong.

Kamohelo ya ngwana

Nna (lebitso la ngwana)…… ke memilwe ho nka karolo diphuputsong tse ngotsweng ka hodimo.

- Mofuputsi le motswadi/ mohlokomedi wa molao ba hlalositse tsohle ka phuputso ena mme kea utlwisisa.
- Ba hlalositse hore karolo yaka phuputsong ke araba lenane-potso ho ka lateloang ke ho etsa puo ka dijo tse nepahetseng le tse sa nepahalang ka nako e sa feteng metsotso e 30.
- Kea tseba hore ha ke sa khotsofala nka ikgula/ tlohela ho nka karolo diphuputsong.

- Ka ho ngola lebitso laka foromong ena ke itlama/ dumela ho nka karolo diphuputsong. Ke tiisa hore ha kea qobellwa/ susumetswa ke Mofuputsi kapa Ba/motswadi/ Mohlokomedi wa Molao ho nka karolo.

…….. …….

Lebitso la ngwana Ho tekena Paki

(Ho ngola ngwana)

Tumelo/ Boitlamo ba Motswadi/ Mohlokomedi wa Molao

Nna (*lebitso la motswadi/ Mohlokomedi wa Molao*) …….
Ke lokolla ngwana wa ka (lebitso la ngwana) …….ya dilemo tse…… ho nka karolo phuputsong ya sehloho sena (Phano ya dijo phedisang mabenkeleng a thekiso ya dijo dikolong: Na hona le tsutsumetso ya boitswaro, mehopolo, mekgwa le ditlwaelo tsa hoja ka mokgwa o nepahetseng?

Ke phatlalatsa hore:

- Ke badile /ke baletsoe litaba tsa foromo ya tumello ya ho nka karolo diphuputsong e ngwotsweng ka puo eseng yaka yeo ke senang bokgoni bo phethahetseng.
- Ha ngwana waka a le dilemo tse kaholdimo ho 7, ke yena ya lokelang ho fana ka bopaki ba ho dumela ho nka karolo diphuputsong, mme Kamohelo (Assent) e lokela ho etswa foromong ena.
- Keile kaba le monyetla wa ho botsa dipotso, mme di arabilwe tsohle hantle**.**
- Ke utlwisisa hantle hore ho nka karolo diphuputsong ke boithaopo baka. Ha kea qobellwa/ susumetswa ho dumella ngwana waka.
- Kena le boikgethelo baho ntsha ngwana waka neng kapa neng, mme ngwana a ke ke a fumantswa kotlo kapa a sekisetswa ka mokgwa ofe kapa ofe.
- Ngwana waka a ka kupua ho tlohela ho nka karolo diphuputsong ha Ngaka e sebetsanang le phuputso ena kapa Mofuputsi ba utlwisisa hore seo se molemong wa ngwana kapa ngwana a sa latela moralo wa phuputso kamoo ho dumellanweng.

Ke-tekena-ke-le (sebaka/ motse) ……ka letsatsi la (date).....

…… ……
Tekena Motswadi / Mohlokomedi wa Molao Ho tekena Paki

Bophatlalatsi ba Mofuputsi

Nna (lebitso) …….. Ke phatlalatsa hore:

- Ke hlaloseditse Batswadi/Bahlokomedi ba Molao ba bana se ngwotsweng foromong ena.
- Ke ba kgothaleditse ho botsa dipotso hore ba utlwisise me ba fulwe nako e lekaneng hore re arabe dipotso.
- Ke kgotsofetse hore ba utlwisisitse ditaba tse mabapi le phuputso jwalo ka ha ho hlalositswe foromong ena.
- Ha kea sebedisa motoloki ho hlalosa ditaba.

E tekenwa mona (sebaka/ motse) …….. ka la (date) ……2011.

…….
Ho tekena Mofuputsi

Appendix J: Excel sheet used for capturing data

Respondent nr	School	1 Grade	2 Gender	3 Age	4 Language	4 Language #	5 Neighbourhoord	5 Neighbourhoord#
1	A	2	F	7	A		WILLOWS	
2	A	2	M	7	A			LILLYVALE
3	A	2	M	8	A		UNIVERSITAS	
4	A	2	F	7	A		LANGENHOVENPARK	
5	A	2	F	7	A		FICHARDTPARK	
6	A	2	M	7	A		LANGENHOVENPARK	
7	A	2	F	7	A		LANGENHOVENPARK	
8	A	2	M	7	A		FAUNA	
9	A	2	M	7	A		LANGENHOVENPARK	
10	A	2	F	7	A		LANGENHOVENPARK	
11	A	3	M	9	A		DAN PIENAAR	
12	A	3	M	9	A		UNIVERSITAS	
13	A	3	M	8	A			BOTSHABELO
14	A	3	M	8	A			
15	A	3	F	8	A			LOURIERPARK
16	A	3	M	8	A		UNIVERSITAS	
17	A	3	F	9	A		WILGEHOF	
18	A	3	F	8	A		LANGENHOVENPARK	
19	A	3	F	8	A		UNIVERSITAS	
20	A	3	F	8	A		LANGENHOVENPARK	
21	A	3	M	8	A		LANGENHOVENPARK	
22	A	3	F	9	A		LANGENHOVENPARK	
23	A	3	F	8	A		FLEURDAL	
24	A	3	F	8	A		LANGENHOVENPARK	
25	A	3	M	8	A		LANGENHOVENPARK	

Appendix K: Summary of grade 2 to 7 learners' perceptions, attitudes and behaviour towards healthy eating

A summary of perceptions, attitudes and behaviour detected during the discussions is presented below. This is the result of the deductive analysis of the discussions, which were based on predetermined codes: P (perception), A+ (positive attitude), A- (negative attitude), B (behaviour), gen= general and veg = vegetables

Table 6.1: Summary of grade 2 to 7 learners' perceptions, attitudes and behaviour towards healthy eating (n=72)

	School A* (n=36)	School B** (n=36)
Grade 2	P_{meat} Meat is not healthy, because it has fat, P_{fat} and fat is not healthy because it comes from animals. P_{fat}Oily food makes fat; is not healthy (misunderstood question about fat at first). B_{fruit} I do not eat fruit, P_{fruit} I am born like this. A^{-}_{veg} I think I do not like vegetables $A^{+/-}_{veg}$ Vegetables are nice and healthy (half of the group liked vegetables and half did not). A^{+}/P_{veg} Vegetables are rather healthy for me, A^{-}_{veg} but the taste is bad. B_{veg}I eat spinach B_{milk} All but one drink milk regularly. A/P_{sugar} Children must not eat too much sweets. A/P_{sugar} (but some uncertainty whether they should be allowed to or not). P_{gen} Uncertain about nutritional quality of pies. A/P_{health} With the exception of tomato and cucumber, all had a good idea of food that is unhealty for children. B_{health} One only drinks water, not milk.	B_{meat} I do not eat fish. A_{fat} I like fat, B_{fat}I only eat fat. P_{fat}Not too much oily food. P_{fat} Fat makes you fat. P_{fat} Fat will not make you fat because it is nice. P_{fruit} Fruit is healthy, good for your stomach, good for the whole body P_{veg} Vegetables are healthy, prevent illness, you have to eat it. B_{veg}I eat spinach A^{+}_{veg} I am crazy about it B_{veg} We have a vegetable garden. A^{+}_{milk}Like milk a lot (majority). P_{milk}Milk makes teeth strong. A^{-}_{milk}Do not like milk because it becomes sour. P_{sugar} Cake has too much sugar. P_{sugar}Children must not eat too much sweets. B_{sugar}We may only eat sweets on Fridays P_{gen} Uncertain about nutritional quality of pies. P_{gen}A bun is bad, because it makes fat. A_{gen} I only like white bread.
Grade 3	P_{meat} Meat, meat , meat. Children must get meat P_{fat}Oily foods make you feel good on the inside ("maak jou binnekant lekker").	P_{fat} Oily foods make you fat. A^{+}_{fat}Oily foods are very nice. (some misunderstood question about fat)

	A^{+}/P_{fruit}Fruit is healthy (majority). A^{-}_{fruit}Fruit is sometimes nice/not always healthy (reference was made to Adam and Eve in the paradise!) A^{-}/P_{fruit}Bananas are for baboons. A^{+}_{veg}They like potatoes (very popular in group). P/A^{-}_{veg}Beetroot is unhealthy "because it has blood." A^{+}_{milk}Everyone in the group likes milk, except vegan girl: P_{milk}It will give cancer. P_{milk}Milk makes teeth white, let teeth grow, B_{milk}Drink milk with milkshake powder. $P_{health/sugar}$ Children should eat nine vegetables a day, then they can get a sweetie. P_{sugar}Sweets cause teeth decay. P_{sugar}One sweet per day $P_{health/meat}$Your body needs meat and fat (nobody in this group mentioned that it can make you fat). P_{health}If you do not eat unhealthy food, you can faint. P_{health} If we eat unhealthy, we can go to gymnastics to get flat tummies (exercise can counteract unhealthy eating). P_{health} Healthy food is only for younger children. P_{health}Children should eat healthy, but also a bit unhealthy (general feeling in group).	A_{fruit}Fruit is nice (general feeling). A/P_{fruit}Fruit is healthy/nice/juicy/gives good energy to your body/does not make you fat/ keeps you healthy. P/A_{veg}Vegetables are good for you/makes you better when you are ill (not all enthusiastic). B_{milk} Most in group drinks milk daily, more than once per day for some. P_{milk}Milk is good for your teeth. A^{+}_{milk}I like milk. P_{milk}Milk is unhealthy; makes you fat. P_{milk}Feta cheese is bad for children P_{milk}("No, feta cheese comes in salad and salad is healthy"). P_{sugar}Children should not eat sweets, because: it makes them fat. B_{sugar}I just keep on eating sweets. A/P_{sugar}Not too much sweets. P_{health}Children should eat healthy and unhealthy.
Grade 4	P_{meat}Polony is healthy. P_{fat}Not too much oily foods because it makes your hand and clothes dirty (some misunderstood question). P_{fruit}Fruit gives you vitamins and protein /gives energy and vitamins. A^{+}/P_{fruit}Fruit is very nice and very healthy. P_{veg}Vegetables are very healthy, like spinach.	P_{meat}Polony is healthy. P_{fat}Not too much oily foods. A_{fruit}Like fruit (generally). A_{veg}Like most of the vegetables.

	P/A^{-}_{veg}Some vegetables are not nice/it tastes bad. P_{veg}Vegetables are not nice for children, only for adults. P_{milk}Milk is very healthy. B_{milk} (most drink milk regularly) B/A_{milk}I do not like plain milk. A/P_{sugar}Not too much sweets. P_{sugar}Sweets will give you diabetes. P_{sugar}Sweets are not good for teeth. (You can eat a little bit of sugar, but if you eat too much you can become ill or fat and will not have any teeth left when you are old) P_{sugar}Children should only eat sweets once a week and further healthy/We must eat super C. P_{gen}Too much white bread is not healthy. P_{health}Food with a bad taste is healthy/good for you. P_{health}All foods that make you fat are bad foods.	P_{veg}Vegetables are healthy. B/A_{milk}They like milk a lot, drink it every day (except diabetic girl at times). A/B_{sugar}Sweets: Limited amounts, like once a day/just a little bit P_{gen}Children can eat anything they are not allergic for/that's not too oily. P_{health}They have a good idea of unhealthy food (sweets, oily food, syrup, chips, chocolate).
Grade 5	P_{meat}Polony is healthy. P/A_{fat}Oily foods: not so healthy/nice to eat/ necessary for the body. A/P_{fruit}Fruit is nice/healthy (general feeling). A^{+-}_{veg}Some like vegetables, some not. All vegetables are not nice. A_{milk}They like milk (all except one girl). B_{milk}All drink milk regularly. P_{sugar}Children must get sweets in / Sometimes they must be spoiled with sweets. P_{health}Children can also eat some unhealthy food. P_{health}Good idea of what types of food are not good for children	P_{meat}Polony is healthy P_{fat}Oily foods: Yes, it's part of being a child/ Not too much/Can make children very fat. A_{fruit}Fruit is awesome/nice. P/A^{+}_{fruit} "like fruit a bit more" than vegetables. You can carry fruit around". A_{veg}Majority like vegetables. B_{milk} All but one drink milk regularly. P_{sugar}Children should eat sweets: now and then/to prevent low sugar/to get something sweet in. P_{sugar}Eat sugar once a week "so that your sugar does not fall". P_{gen}White bread can be both healthy and unhealthy / Brown bread is good. P_{health}Children should eat lots of fruits and

		vegetables with something nice once a day. P_{health}They have a good idea of food bad for children.
Grade 6	P_{meat}Polony is healthy. P_{fat}Fat and oily foods can also be healthy "in another way" / Some fats can be healthy and some not (clear understanding). A^{+}/P_{fruit}Fruit is tasty/healthy/give energy/can drink the juice/some give more energy than others / give enough energy for the whole day. $P/A^{+}{}_{veg}$ Vegetables: healthy/tasty/some nicer than others. B_{veg} You can eat vegetables you don't like with a sauce or in a stew. B/A_{milk}Milk: four like it and drink it regularly (two are allergic). PB_{sugar}Sweets: not too much/limited amounts. P_{sugar}Too much sweets can make you become nauseas/fat/unfit/very lazy/give you too much energy. P_{sugar}Too much sweets can make you addicted to it P_{gen}Brown bread more healthy than white P_{health}Good idea of healthy food, including water. P_{health}Good idea of food bad for children.	P_{meat}Polony is healthy. P_{fat}Oily foods: not too much/can get fat/ Oil is not good for you. P_{fat}Uncertain about peanut butter. A^{+}/P_{fruit} Fruit: nice/ very healthy (general feeling). $P/A^{+-}{}_{veg}$Vegetables: like some and some not. B_{milk}Majority drink milk regularly; one only with coffee and tea. P_{sugar}Not all sweets are bad for children / Not too much sweets. P_{sugar}Sweets will make you fat/cause teeth decay/ give you diabetes /Super C is good for energy. P_{health}They have a good idea of food bad for children.
Grade 7	P_{meat}Polony is healthy P_{fat}Children may eat oily food, but not too much/ not necessarily good for them/not every day. $A^{+}{}_{fruit}$ Fruit taste good, they like most or all fruit. $A^{+-}{}_{veg}$Vegetables: difference in opinion. A^{-}/P_{veg}Broccoli and spinach are bad for children. A_{milk}Like milk. P_{sugar}Sweets: We need to be spoiled sometimes.	P_{meat}Polony is healthy. P_{fat}Oily foods: Now and then/ Your body needs fat and oils, but not too much. P_{fat}Fat is stored in your body and you cannot get it always out, then you get cholesterol. A_{fruit}Most fruits are nice/ Like fruit B_{fruit} Eat fruit regularly. P/A_{veg} Some are nice, others not B_{veg}Eat anything except spinach and cauliflower. B_{milk} Milk: All drink regularly.

	P_{gen}Brown bread is healthy P_{health}Children should get a variety in/ balance important. P_{health}One can keep it balanced Not too much.	A/P_{sugar}Sweets: not too much/must not over eat/it's dessert/ sweets make fat/ not healthy. P_{health}You must be active (unhealthy balanced out by unhealthy). A/P_{health}They have a good idea of healthy food (but like sweets more).

The pre-determined codes that were used included the following: P (perception), A^+ (positive attitude), A^- (negative attitude) and B (behaviour). gen= general, veg = vegetables,*School A = nutritionally-regulated tuck shop; **School B = conventional tuck shop

Appendix L: Tuck shop food, snack and beverage items in school A and B

Table 6.2: Nutritional information of beverages in school A's tuck shop

Item	Portion	Energy (kJ)	Carbohydrates (g)	Protein (g)	Fat (g)
Minute Maid Bfast blend	330ml	771	40	0	0
Pure Joy Apple juice	200ml	233	13.4	0.1	0
Strawberry smoothie	250ml	617.6	19.6	3.1	2.6
Ceres Cranberry & Kiwi	200ml	422	25.4	0.2	0
Homemade Ice tea (Rooibos tea and fruit juice)	500ml	349.5	20.1	0.15	0
Tropical 100% fruit blend	200ml	228	13.4	0	0
Water	500ml	0	0	0	0
Slushy	250ml	194	11.1	0.08	0
Iced lollie (diluted frozen fruit juice)	100ml	93.2	5.3	0.04	0

Table 6.3: Nutritional information of food and snacks in school A's tuck shop

Item	Portion	Energy (kJ)	Carbohydrates (g)	Protein (g)	Fat (g)
Tortilla	1	1182.7	28.9	25.5	6.8
Samoosa (phyllo pastry filled with mince, potato and vegetables)	1	276.9	6.4	5.5	2
Salad	1 cup	163.4	7.4	1.7	0.2
Low GI Pancake (with added oat bran)	1 (including 1t sugar)	546.5	20	4.5	3.5
Hamburger (homemade and contain mince with added beans, digestive bran and grated apple)	1	763.6	26.2	10.2	3.7
Chicken sandwich (skinless chicken breast pieces with mayonnaise and plain yoghurt mix)	Half sandwich (1 slice)	712.6	23.9	10.4	3.4

Table 6.3 Continued

Item	Portion	Energy (kJ)	Carbohydrates (g)	Protein (g)	Fat (g)
Hot dog with boerewors sausage*	1	1481.2	37.7	10.6	17.8
Jungle energy bar, yoghurt	40g	739.2	22.3	2.4	7.2
Jungle energy bar, nuts	40g	786	23.1	3.2	9.2
Montagu fruit flakes	40g	492	30	1	0
Banana	1	286.5	15.4	1	0.2
Apple	120g	320	18.4	0.2	0
Mini Fruit roll	2g	30.6	1.7	0	0
Watermelon slices	220g	303.6	15.4	2	0
Salted peanuts	50g	1282	8.5	13	25
Peanuts and raisins	50g	1189	8.5	13	22.5
Brownies (with added beans, beetroot and apple)	1 square	516.7	23.9	3.2	1.5
Chocolate muffins (with added oat bran, digestive bran and cereal)	1	559.4	23.5	3.5	2.8
Carrot & pineapple muffins (with added oat bran, plain yoghurt, banana, pineapple and carrot)	1	430.4	14.2	2	4.3
Sucrose free Candy (contains Isomalt)	3 sweets	87.3	9	0	0
Popcorn (air-popped, no fat added)	1 packet	375.8	11.2	1.9	4.1

*only available once per week

Table 6.4: Nutritional information of beverages in school B's tuck shop

Item	Portion	Energy (kJ)	Carbohydrates (g)	Protein (g)	Fat (g)
Coke	330ml	594	36.3	0	0
Sprite Zero	330ml	10.8	0	0.03	0
Lemon Twist	330ml	681.5	39.3	0	0
Water	500ml	0	0	0	0
Powerade	500ml	645	39	0	0
Energade	500ml	600	35	0	0
Oros	300ml	477	29.37	0.002	<0.03
Drink-o-pop	150ml	94	5.55	0	0
Iced lollie (frozen cordial)	100ml	160	9.7	0	0
Milo	250ml	873	30.5	6	5.3
Flavoured Milk	350ml	250	9	3	1.5
Drinking yoghurt	300ml	396	16.3	3.4	1.8
Fruit juice	300ml	648	36	0.6	0.3
Sparletta	330ml	624.8	36.3	0	0
Sprite	330ml	582	33.7	0	0
Coke light	330ml	1	0	0	0
Fanta	330ml	770	44.8	0	0
Cream soda	330ml	625.9	36.4	0	0
Tab	330ml	2.7	0	0.02	0

Table 6.5: Nutritional information of food and snacks in school B's tuck shop

Item	Portion	Energy (kJ)	Carbohydrates (g)	Protein (g)	Fat (g)
Chicken mayo pita	170g	2036.6	45.1	20.3	25
Pie (meat filling)	170g	2854.3	28.9	30.6	49.8
Toasted Polony & Cheese sandwich ("ham & cheese")	1 sandwich(2 slices)	1291.7	33	9.7	15.3
Hotdog with Vienna	1	1264	34.9	7.1	14.9
Beef burger	152g	1522.3	40.2	15.5	15.6
Roasted corn	60g	1096.2	43.5	5.32	8.6
Crunchie	33g	638	24.7	1.4	5.9
Biltong wheel	17g	221.7	0.4	7.4	2.4
Cupcake with icing	52g	505.9	17.7	1.2	5.1

Table 6.5 Continued

Item	Portion	Energy (kJ)	Carbohydrates (g)	Protein (g)	Fat (g)
Choc-chip muffin with cheese	60g	698.6	24	5.5	5.3
Milk tart	100g	928	25.2	4.8	11.3
Savoury tart	165g	2204.4	26.7	19.6	38.3
Biscuit	1	387	14.1	0.9	3.6
Rusk	1	338.3	10.7	1.5	3.5
Banana	1	286.5	15.4	1	0.2
Peach	148g	290.1	15.7	1	0.1
Coconut ice	16g	304.8	13.2	0.2	2.1
Fudge	20g	359	14.9	0.6	2.6
Doughnut	147g	2509.3	84.5	7.1	25.7
Tinkie	45g	317.3	22	1.6	5.4
Jungle bar, yoghurt	40g	739.2	22.3	2.4	7.2
Safari fruit bites	32g	482	25.9	0.74	0.13
Peanuts	45g	1070	7.7	11.7	20.3
Nutriday yoghurt	100g	413	16	3.3	2.3
Jelly babies	75g	332	19.5	1.4	0
Jelly beans	75g	353	22.8	0	0
Tempo Chocolate	53g	1103	31.3	1.9	15
Flake chocolate	32g	696	19.9	2.4	9.1
PS Chocolate	46g	1003	28.8	2.3	13.7
Bar-one Chocolate	55g	1007	36.7	2.4	10.9
Doritos chips	45g	959	280	4	11
Simba chips	36g	784	16	2.7	12.6
Fritos chips	50g	1134	26.2	3.5	18
Lays chips	36g	802	18	2.4	12.8